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The Engineering and Mining Journal

JANUARY 14, 1911.

The Calumet & Hecla Consolidation

The proposed absorption by the Calumet & Hecla of the several copper-mining companies in which it is already interested as part owner, is one of the most legitimate consolidations advanced in many a day. This is not a scheme that is tainted by the least suspicion of stock-jobbery or the capitalization of promoters' visions. It has been devised by the Calumet & Hecla management upon the sole ground of increased efficiency and the conservation of property. The conditions that permit the introduction of economies and make it advisable to strive for them are lucidly explained in the statement to the stockholders. Briefly these may be summarized as the ability to avoid much costly development work, unnecessary duplication of plant and unnecessary administrative expense, which are involved by separate ownership, while moreover it will be possible for the consolidated company to select its ore for extraction with a better adjustment to market conditions than could be done by a group of small companies.

These are thoroughly established reasons in favor of the unified operation of a group of mines in the same district. The benefit of such a plan has been wonderfully exemplified by the methods of the United States Steel Corporation in its iron mines in Minnesota, and within the last year by Anaconda, at Butte, whose operative consolidation was carried through upon the same grounds as now proposed by the Calumet & Hecla.

In this last case there is no attempt to disguise the situation of the Calumet & Hecla itself. Its ore is becoming impoverished and the ore of its conglomerate lode will not last for a great many years more. When this ore is exhausted a great deal of the enormously costly plant will become mere junk unless its usefulness be extended by the provision of an additional supply of ore. Thus its stockholders have much to gain, while the stockholders in the minor companies will benefit not only from such economies as are referred to above, but also will be put in the way of getting dividends immediately.

We are not going to discuss the fairness of the valuations placed upon the several stocks that it is proposed to exchange. No one can do that intelligently without being in full possession of the data and devoting much time to its consideration. This has, of course, been done by the Calumet & Hecla management, and inasmuch as its integrity and intelligence are both unquestionable, we may assume that it has deliberately decided upon terms that are fair and equitable. The management had, moreover, the wisdom to call in a distinguished consulting engineer to advise upon this subject.

Nevertheless, some vigorous opposition to the terms, if not to the plan itself, has been expressed. This seems to come from some stockholders who purchased their shares at higher prices and dislike to see their names removed from the stock-exchange list, and thereby lose the chance of selling out during some future boom. In other words they do not relish the conversion of gambling counters into real investment shares whereof the value will be more nearly commensurate with that of the portion of the mine th they represent. Of the Calumet & Hecla group, barring the main company, Osceola is the only one now paying dividends, and Allouez and Ahmeek the only ones that promise to become dividend payers in the near future. To those stockholders who have gone into these enterprises upon a sound investment basis, we should say that the opportunity to convert them into shares immediately paying dividends, ought to be welcome.

To the wiseacres who see in the Calumet & Hecla consolidation a step toward the general consolidation of the copper industry, that has been talked about during the last two years, we can say with-

out qualification that it means nothing of the sort. It means nothing more, indeed, than what the Calumet & Hecla people have frankly stated.

The Business Situation

The total volume of business in 1910 was undoubtedly a little less than in 1909, but the wheels of commerce and industry are still turning well and are likely to continue so to do. The misgivings about the future emanate chiefly from those producers who, having enormously increased their capacity find themselves now unable to keep it all in operation.

Every great financial and industrial crisis has been produced by the locking up of capital in fixed investments and the overuse of credit to support an artificial situation. The events leading to the panic of 1907 were no exception to this rule. The subsequent history has also been similar in each case. First there is a period of prostration; then a premature upward movement, when the financial community persuades itself that the previous collapse, however disastrous and painful, really was of no serious meaning, this being what we experienced in 1909; then there is a secondary reaction; and finally the rebuilding upon a solid basis. The mining industry, which is a basic industry, has had this recent history along with the other industries. In Europe the crisis of 1907 was far less serious than in America and since then its trade had trended more steadily upward. We ended 1909 in a flush of rosy anticipation; we begin 1911 with gloomy forebodings. We may be as wrong now as we were then. The recovery from every crisis has been slow. After that of 1873 liquidation continued for six years; after that of 1893 about four years. The panic of 1907 is now more than three years behind us. It is possible that the rebuilding of our commercial structure on a sound foundation will begin in the near future.

During 1910 we heard less about the high prices for commodities being due to the increasing production of gold. Ever since the crisis of 1907 the world's yield of gold has kept on increasing, 1910 having continued the record, while prices have been fluctuating. Notwithstanding the augmentation of gold supply there were fears of financial stringency, happily avoided just because financiers prepared so carefully to prevent it. The cost of living has continued to run high, on the whole, but commodity prices are broadly explained by demand and supply, and the results of the last census of the United States, showing the remarkable tendency toward concentration of population in the cities, throw light upon this subject.

The Bingham Report of the Geological Survey

We have often criticized the U. S. Geological Survey, upon grounds that have seemed good to us, with respect to some of its policies and shortcomings, but we have never minimized its services to the mining industry and least of all have we questioned its integrity. Throughout its whole history its honor has been unstained and it has been an organization of which all citizens have rightly been prooud. It is a pity therefore that *Mines and Methods* should have seen fit to charge it with subservience to private interests, amounting to dishonesty, and we have nothing but contempt for such an unjustifiable accusation. It was quite unnecessary for the Director to trouble himself to make the specific and conclusive reply, whereof we publish a copy elsewhere.

The record of the Bingham report is not one for the Survey to be proud of, but this is because it is a record of dilatoriness and ineffective management, not of any intention to delay. The same thing has happened to many others of its reports, and even at the present time its reports on Park City and Butte are hanging fire. This is one of the things for which we used to criticize the Survey and the justice of those criticisms is recognized. The fault was primarily with the geologists, who frequently failed to appreciate the importance of prompt publication. As scientists of whom careful consideration and minute study are demanded they cannot be driven like clerks, or even like engineers in practice. Sometimes they have perhaps delayed in order to obtain late information before committing themselves finally. Moreover, they may sometimes have found an excuse in the mismanagement of a superior in detailing them to a new study before the old one was done. After the delivery of the report in manuscript there is the long time inevitably involved in putting it through the press. Such a history appears in the record of the Bingham report.

In late years the Survey has greatly improved its practice in this particular, it having been made a rule that geologists shall complete their field work on one investigation before beginning another; and attention has been given to the mechanical part of the publication with the result that recent reports have gone through the Government Printing Office in much less time than formerly. The idiosyncrasies and procrastination of individual geologists will, however, always remain a factor incapable of much control in the way of expedition.

With respect to the Bingham report, inasmuch as Doctor Smith has so fully exposed the groundless aspersions upon it, we do not think it necessary to add particulars in its defense. Not even were the affairs of the Utah Consolidated Mining Company as represented by *Mines and Methods*. Its unwarranted attack upon the Geological Survey deserves the most emphatic condemnation. The mining industry of the United States rests secure in its faith in the honor of the Geological Survey and knows that it never has subserved itself to private interests, but has worked loyally and truly for the whole people and in so doing has achieved a record of which it is proud, and of which we are all proud.

Lest We Forget

This is a season of balance-sheet adjustments, reports of yearly tonnages, and of costs per ton; of congratulations if the costs are down and tonnages up; of strict searching for causes if the opposite be true. There is, however, another balance to be cast, which is sometimes neglected. In the mining industry, low costs per ton are not always indicative of the highest regard for the shareholder's pocket. Material may be mined which should be left in the stopes, or milled, when it should be sent to the dump. In short, the superintendent plays to the gallery instead of working for the company that employs him.

Still further, there are certain considerations which should weigh even against greatest immediate profit. Is it just to use projecting set screws instead of the countersunk, because changing

would cost a few cents per screw, and the accident company pays for workingmen's fingers? Should elevator wells stand unguarded because the factory inspector failed to see them? Or has anything whatever been done to better social or working conditions in or around the plant?

And if not, is it not well to remember at this season that everyone owes some obligations to the world at large?

The Copper Statistics for December

The report of the Copper Producers' Association for December was the most astonishing of its series. Everyone was expecting a decrease in production, a maintenance of deliveries at about the same rate as in November and a decrease of about ten million pounds in the stock. In the last particular expectations were practically realized, but the manner of it was but little short of preposterous, or thus it would have been characterized at any time previous to the publication of the figures. Production increased, and so fortunately did deliveries also; but of the deliveries, the domestic were only 43,600,000 lb. while the foreign were 88,000,000! There is not much use in discussing such figures. We must await the lapse of time for their meaning to become clear.

The futility of attempting to draw far-reaching conclusions from the monthly statistics is amply illustrated by the complete summary for the year that we presented last week. There are to be found statistics which would be confusing, if not quite misleading, if individually considered. Thus, the production of the United States decreased, owing to the curtailment in the second semester, but that of Mexico, Canada and Cuba increased, which when combined with larger imports from other foreign countries gave our refiners about as large a supply of crude material as they had in 1909. However, some of this copper was metal that formerly went elsewhere, wherefore an increase in the American refinery production does not necessarily imply an increase in the world's supply. In fact, the world's production of copper in 1910 seems to have increased only about 10,000 tons, or but little more than 1 per cent., while the visible supply decreased by 70,000 metric tons. This, of course, is the essence of the statistics of 1910 and it can hardly be interpreted as otherwise than favorable.

The Fire Loss

In testifying before the New York legislative graft committee, Dec. 23, Franklin W. Wentworth, of Boston, secretary of the National Fire Protection Association, made the following extremely lucid and highly instructive remarks:

"We have not really begun to face the questions that are yet to confront us as the direct result of our carelessness of the fire hazard. The growing tendency toward State interference in the business of fire insurance is nothing more or less than a protest against the frightful improvishment of the nation by fire. The people feel that the fire tax is too high. It is too high. Everybody knows that it is too high. But how can the fire tax be lessened, except by attacking the cause of it?

"The fire waste touches the pocket of every man, woman and child in the nation; it strikes as surely but as quietly as indirect taxation; it merges with the cost of everything we eat and drink and wear. The profligate burning every year of $250,000,000 worth of the work of men's hands means the inevitable impoverishment of the nation. What if we were to lose that sum annually out of the national Treasury, or in wheat, or corn, or cotton?

"A loss of $250,000,000 a year means $500 a minute for every hour of the twenty-four. This fearful loss, spread over the entire business world of America, is beginning to manifest its impoverishing blight. The people feel it without yet being awake to its cause. Their awakening is retarded by the prevalence of the foolish notion that the insurance companies pay this colossal tax. But how could they, and remain solvent? They are mere collectors and distributors of that portion of this tax which is represented by their policies."

The above strictures of Mr. Wentworth apply as strongly to the mining and metallurgical industry as to nearly all others. Although no special statistical study of this particular subject has ever been made, so far as we are aware, it is well known that the annual fire loss attains a huge figure. Mining and metallurgical buildings are commonly of flimsy and hazardous construction, dangerous operations are frequently conducted in them, means for extinguishing incipient fires are not often provided, and consequently the insurance of property of this kind is regarded by underwriters as a risk requiring a high rate of premium. For that reason buildings and plant employed in the mining and metallurgical industry are frequently allowed to go uninsured; in other words, the owner takes all the chances of loss by fire.

The odds against success in taking such chances were impressed upon our mind during a recent perusal of the chronology of mining that we publish monthly in the JOURNAL, summarizing the more important events. In the maintenance of this record the matter of fire loss has received no special attention and doubtless many reports of destruction by fire failed to be entered for the reason of insufficient importance in the view respecting this general chronicle. The frequency of such reports as did obtain record, however, led us to make an enumeration of them. This showed that in 1910 up to Dec. 1 there had been reported 11 fires involving a loss of $937,000, and eight fires for which the amount of loss was not stated. This enumeration omitted all losses arising from the forest fires in the Northwest and all losses directly due to colliery explosions.

According to Mr. Wentworth, statistics show that the actual loss in fire underwriting during the last decennial period has been nearly 4 per cent. of the property insured. Whether that figure would be representative of the loss to the mining industry cannot, perhaps, be pronounced, but there is no doubt that the loss actually suffered comes to a disgracefully large total, and might be largely avoided by better forms of construction and the exercise of more care all around.

The choice of James A. Farrell as president of the United States Steel Corporation in place of William E. Corey is noteworthy for two reasons. Mr. Farrell has been head of the export branch of the corporation, and is a selling and financial man, not a practical steel maker, as the two presidents who preceded him were. And his election perhaps emphasizes the passing of the Carnegie element.

By the Way

The No. 2 Colliery of the Kingston Coal Company, Kingston, Penn., during the year 1910, mined and shipped 1,020,405 tons, this being the first instance in the history of the anthracite region for one breaker to prepare for shipment over one million tons. The total shipment of the Kingston Coal Company for 1910 was 2,131,672 tons.

An engineer in the field writes: We have all heard of the "Eastern manager" who sent to the supply house to get his foreman a gouge to shoot to. But what do you know about this: The "Eastern manager" of certain lead mines that are working fluorite veins carrying a small per cent. of galena, but more otten pure fluorite, recently sent in an order to a wholesale grocery house for six barrels of fluorspar to be used in one of their plants. This is a fact and seems to me too good to keep.

That the printer's devil is not always exorcised by the proofreader is shown by a recent break in the JOURNAL'S own columns: U. S. Patent 978,211 on metal refining is given as "the art of extracting meals electrolytically." A correspondent inquires whether the process is to be used by the ultimate consumer, or whether the predatory corporation will use it on him, and says if it is the latter, that it is the crowning outrage, in view of the present difficulty of acquiring the raw material. Another boost to the cost of high living!

We note in an exchange the statement, authority not given, that "it has been demonstrated that if the velocity of the gas (escaping from a furnace) be reduced to about 3 ft. per second, there will be practically complete settling (of dust) in less than 500 ft. in about eight minutes." We do not think this can really have been demonstrated, because 3 ft. per second is 180 ft. per minute and in eight minutes the travel would be 1440 ft. However, a reduction of velocity to 3 ft. per second is certainly very good for the settling of dust.

We had an opportunity recently to examine an estimate for a dwelling house that was to cost about $15,000. One item in this estimate was "metal work, all copper, $350." There was a note stating that this item would be only $200 if galvanized iron were used. The man who is to build this house decided for copper, the extra cost being insignificant and in fact no extra cost at all if the matter of subsequent replacement, inevitable in the case of galvanized iron, be taken into consideration. This is merely an example of how a relatively low price for copper stimulates its use. If the price of copper had been 20c. per lb. instead of 12½c., the decision would very likely have been different.

First, there is a steel producers' dinner, and then a copper producers' dinner; then another steel producers' dinner, and another copper producers' dinner; presently a steel producers' dinner again, and a copper producers' dinner again. Everybody agrees that the steel business is the greatest business in the world, or that the copper industry is the greatest industry of all, that harmony is the best policy, that it is the function of consumers to consume, and profits ought never to be less. But the consumers are never asked, nor do they hold, dinners of their own. Thus says the *Evening Post* . However, we do not think that the consumers of copper have had anything whereof to complain in the copper market of the last two years.

Several "paper-mining" ventures received severe rents in their flamboyant posters of easily amassable wealth when the Federal authorities raided the office of the Inter-Trust Security Company in Boston, on Jan. 6, for alleged fraudulent use of the mails. According to despatches the company was headed by Victor M. Weil and controlled the Rawhide-Boston Mining Company, Nevada-Boston Mining Company, United States Gold Mining Company, Victor M. Weil Exploration Company, Howell Little Mining Company and Standard Amalgamated Exploration Corporation. Ever visit or hear of any of these great mines? Those who had beautifully engraved certificates of stock in the above corporations will probably be able to effect a considerable saving in wall-paper bills next spring.

The Calumet & Hecla consolidation plan has aroused considerable opposition among minority stockholders of the companies to be absorbed, expressed as follows: "Purchasers of Isle Royale and Lasalle at high prices are exceedingly bitter over the ratio of exchange and see no chance for ever getting their money back if they are obliged to take the new Calumet stock. For instance, those who bought Lasalle all the way down from $19 now find that in the exchange for Calumet they will get only two shares of the new stock for each 100 shares of Lasalle. Allowing that the new Calumet stock will sell at around $230 a share, they fail to see any benefit coming their way. Even if Lasalle never becomes a producer on a large scale these stockholders feel that the stock will appreciate in price when a good copper-share boom comes, whereas Calumet will have to double or treble for them to get out whole. The same argument prevails in regard to Isle Royale, which sold at $28 in 1910." This is the philosophy of copper-stock speculation in a nutshell. It is not so much the actual worth of a stock that counts as the chance for selling high on a boom. But yet someone must hold the bag.

The Post Office Department believes that it has found in an old statute authority that will permit it to establish a parcels-post system in the United States. The statute states that the department is the only one that has the right to carry "letters" or "packets." If the words "packet" and "parcel" are synonymous, a parcels post may perhaps be established without waiting for legislation. The question has been referred to the Interstate Commerce Commission for settlement. We read the foregoing in a usually reliable exchange. The parcels-post question is one of interest and importance to mining men, many of whom live in places where they are greatly dependent upon the express companies. Some of our readers have urged us to exert our influence in favor of a parcels post. We shall have pleasure in doing what we can. We have no doubt that a great majority of the people want a parcels post. Some years ago a member of Congress was asked, "What is the reason that we cannot have a parcels post?" He said, "The reason is Thomas C. Platt and the United States Express Company." This is a striking illumination of the principle of "Government of, by and for the people" as now in vogue.

Reverting to the vernacular, you have to hand it to Porcupine. It has just burst forth as a full-fledged goldfield, having annexed a "lady miner" whom the daily press has recently featured with a "society" photograph and one of "local color," beside a dog team. The honors, however, are not exclusively Porcupine's, and must be divided with Columbia and possibly with Cobalt, which is said to have been the scene of Mrs. F. B. Flower's first experience and after which, according to the New York *Evening Mail*, she entered the School of Mines at Columbia and, of course, "passed her examinations while men in the class flunked." Mrs. Flower is stated to have six claims in Porcupine, one being named Columbia, after her *alma mater*, and another Goldenrod, the discoverer having golden hair; just what she thinks about the camp she has put into verse to be sung to a popular melody. Incidentally, it is mentioned that Mrs. Flower was formerly a New York music teacher, with a studio in Carnegie hall, having studied abroad six years with Moszkowski, Scharwenka and other masters, and having subsequently bought a New York apartment house with her earnings. Ill health, however, compelled her to seek an open-air life, hence her joining the rushes to Cobalt and Porcupine. Mrs. Flower evidently has an efficient press agent, second to none, not even Porcupine's own, or Caruso's or Mary Garden's.

Correspondence and Discussion

The Bingham Report of the United States Geological Survey

In its issue of December, 1910, *Mines and Methods*, of Salt Lake City, charged the U. S. Geological Survey with delay in the publication of its Bingham report in order to serve private interests. In reply thereto the following self-explanatory letter has been written by the director of the Geological Survey. Further reference to this matter will be found in our editorial pages.

Editor, *Mines and Methods*,
Salt Lake City, Utah.

Sir:—My attention has been called to an article in the December number of *Mines and Methods* on the Utah Consolidated mine, which, among other false and garbled statements, charges (pp. 76 and 77) that the Bingham report of the U. S. Geological Survey, after completion by the authors, was suppressed by "others higher up the line from whom orders emanate," and its publication "held in abeyance for about four years" in the interest of some unnamed influential individuals connected with the mines of that district.

The administrative act alleged in your journal would have been that of my predecessor, but all the facts in the case are matters of official record, and, as the present head of the Geological Survey, I am as well qualified to present those facts and deny the charge as Doctor Walcott himself. Indeed, during the period to which reference is made, I was a Survey geologist, closely associated with each of the geologists concerned in the Bingham work, and especially interested in its progress, from the fact that only a few years before I had completed a report on the Tintic district in the same State, so that I am personally cognizant of all the circumstances attending the preparation and publication of the Bingham report.

Publication of Report Was Not Purposely Delayed

I now address you as the editor of *Mines and Methods* with the purpose of making an unqualified denial of the charge that there was any suppression of the report on the Bingham mining district for the purpose of delaying its publication, an anyone's interest. The geologic field work in the Bingham district was begun in July, 1900, and the printed report issued Aug. 11, 1905.

In the case of the Bingham report, the chief causes of delay were briefly explained by S. F. Emmons, who had charge of the work, in his introduction

Views, Suggestions and Experiences of Readers

(Professional Paper No. 38, pp. 19 and 20). That statement could have been verified by anyone who really desired to obtain the facts, by reference to the records on file in this office, or to statements in the administrative reports of the director for the years involved.

It is not worth while to attempt to correct the errors in the article in *Mines and Methods* as respects the statements relating to the geology of the Bingham district, as these are readily apparent to mining men familiar with the region, or the erroneous references to statements in the Survey report, as those can be tested by comparison with the printed report. The character of these errors may be inferred from the alleged quotation from the addendum in the Survey report whereby it is claimed Mr. Boutwell tries to justify and support his "humiliating apology" for the delay, which quotation of half a dozen lines is a pure fabrication by the writer of the *Mines and Methods* article and is not to be found anywhere in the printed report.

The Chronological History of the Report

To meet the published charge of "higher officials" holding Mr. Boutwell's report "in abeyance for about four years," a summary of the official records is herewith presented:

(1) *Record of field work, July 17 to December,* 1900: Field work by Mr. Boutwell; July 17 to Aug. 11 and Sept. 20 to 26, 1900, field work by Mr. Emmons; Aug. 9 to Sept. 6, 1900, field work by Mr. Keith; Sept. 2 to Sept. 8, 1900, field work by Mr. Girty; July 1 to July 21, 1901, field work by Mr. Boutwell; Mr. Boutwell spent four days in Bingham district in 1902 and one day in 1904.

(2) *Record of Mr. Boutwell's occupation after completion of field work in Bingham,* 1901: July, 1901, to March 2, 1902, assisted Mr. Lindgren in field work on auriferous gravels of California, and on copper deposits of Morenci, Ariz.; March 10 to July 1, 1902, office work on Bingham report; July 1 to December, 1902, field work at Park City, Utah; January. 1903, to July, 1903, office work, Bingham report; July, 1903, to February, 1904, field work, Park City, Utah; March, 1904, on oil prospects in Utah; April and May, 1904, office work, Bingham report; June, 1904, revision of Bingham manuscript and preparation of illustrations.

(3) *Record of work in preparing report for publication*: March 9, 1903, preliminary report by Mr. Boutwell submitted for publication in Annual Economic Bulletin for 1902; April 25, 1903, date of issue of Annual Economic Bulletin, No. 213, 1902, containing a 17-page report (pp. 105 to 122) entitled "Ore Deposits of Bingham, Utah"; a second progress report, with the same title is contained in Bulletin No. 260—Economic Geology for 1904 (pp. 236 to 241), issued May 19, 1905; April, 1903, manuscript of areal geology completed by Mr. Keith; June, 1903, areal-geology maps, sections and photo-illustrations completed by Mr. Keith; Nov. 9, 1903, transmittal of areal-geology manuscript by Mr. Keith; May, 1904, revision of areal-geology manuscript by Mr. Keith; June 28, 1904, revised manuscript of areal geology transmitted by Mr. Keith; June 30, 1904, economic-geology manuscript transmitted by Mr. Boutwell; July 1 to 14, 1904, final reading of manuscript for Professional Paper 38 by Mr. Emmons and writing of introduction; July 19, 1904, copy for Mr. Boutwell's illustrations received by section of Illustrations; Aug. 8, 1904, illustrations prepared and submitted to editor; Aug. 15, 1904, date of transmittal of manuscript for Professional Paper 38 by geologist in charge of geology; Aug. 15, 1904, manuscript received by Survey editor; Aug. 31, 1904, illustrations by Mr. Boutwell returned for revision; Oct. 8, 1904, illustrations transmitted to public printer.

The contract time on the lithographs was six months. Oct. 11, 1904, edited text sent to public printer; Jan. 23, 1905, first proof of text received; March 1, 1905, first proof of illustrations received; April 29, 1905, last proof of illustrations returned to public printer; May 26, 1905, last proof of text returned to public printer; Aug. 4, 1905, edition of plates delivered to public printer; Aug. 11, 1905, edition of report delivered.

The record shows that the field work was practically completed in 1901. Presumably the writer of the article in *Mines and Methods* did not fully understand that in the report on a large district like Bingham there is involved office work of considerably longer duration than the field work, in this case about 14 months. Administrative exigencies led Mr. Emmons to detail Mr. Boutwell to other work at Clifton and at Park City. The delay was thus caused by these two factors, office work and other field work. The record further shows

that the complete report was transmitted by the geologist in charge of geology on Aug. 15, 1904, and that it was issued almost exactly a year later. For a report of this character, with numerous and complicated illustrations, this was, at that time, a good record—as good as could be obtained. Since then both Director Walcott and myself have endeavored to reduce still further the causes of delay connected with the procedure of editorial preparation and the mechanical processes of printing and engraving. I believe that the record shows conclusively how utterly groundless is your charge that the delay in the publication of the report on the Bingham mining district was caused by Director Walcott or anyone else "higher up the line from whom orders emanate."

GEORGE OTIS SMITH,
Director U. S. Geological Survey.

Washington, D. C., Jan. 6, 1911.

Reducing Mining Costs and Increasing Profits

I realize that the article published in the JOURNAL of Dec. 24 under the above title was written by Mr. Argall for an after-dinner address, and for this reason detailed information was omitted. The subject is, however, so interesting and one of such prime importance that I should like to hear more of the details of the practice at the Stratton's Independence mill. Judging from the results attained at this plant the subject merits a fuller and more detailed description. Mr. Argall states that "we have no secrets," so, in case he does not care to take the time necessary for writing a satisfactory description of the operations, he should be willing to allow someone else who has the time and is familiar with the plant and its operation to treat the subject.

Literature on cyaniding, and especially the treatment of sulphurets and sulphotellurides by the cyanide process, is, for the most part, unsatisfactory, so additional information along these lines is always interesting. Most of the published articles deal with the subject in such a general manner as to be of little practical value to the operating man.

J. BODY.

New York, Dec. 26, 1910.

Briqueting Fine Iron Ores

I note the recommendations of the British Iron and Steel Institute given in the JOURNAL of Dec. 24, 1910, concerning the briquetting of iron ores. While all of the qualifications laid down there are highly commendable, all the seven rules are not worth so much as information concerning one good binding material would be. The nodulizing processes seem to hold the field, although good briquets were produced at Garwood, N. J., a few years ago with lime as a binder, using a mixing and molding apparatus somewhat like the modern continuous-brick machines. However, the process was expensive, I am told. I have also seen portland cement recommended, but the introduction of extra silica and alumina certainly seems reprehensible. The general subject of briquetting is one on which, personally, I should much prefer further information about binders, rather than rules to which I am invited to make hypothetical briquets conform.

A. A. NASON.

New York, Dec. 26, 1910.

Chilean Nitrate Outlook

I desire to call attention to the figures published on page 1211 of the JOURNAL for Dec. 17, 1910. Under the heading "Chilean Nitrate Outlook," certain figures are given for production, exports and world's consumption of nitrate, which I am reasonably certain are in error. The article says: "The world's consumption was 4,399,698 tons for the first nine months of 1910 against 3,612,020 tons for the same period in 1910. "According to the figures carefully collected and published in the *Estadistica Minera de Chile* for 1908 and 1909 (Vol. IV), the total consumption of nitrate by the world in 1909 was only 20,462,299 metric quintales, or 2,046,229.9 metric tons. The total production of Chile in 1909 was 2,110,960.6 metric tons and the exports in 1909 were 2,133,970.2 metric tons. As these figures are usually reported in Chile in "Spanish quintales" of 46 kg. each, it occurs to me that your informant may have mistaken Spanish quintales of 46 kg., or about 101 lb., for metric quintales of 100 kg., or 220.5 lb., each, and have arrived at his figures in tons by simply calculating 10 quintales to the ton—which is the case when the figures are metric quintales and which would give him a result as many times too great as is the quotient of $100 \div 46$.

Reducing the figures he gives as the world's consumption and the Chilean production in this proportion I think one will arrive at a result very nearly equal to the figures published by the *Estadistica Minera* and the Association Salitrera.

HARRIS K. MASTERS.

Salt Lake City, Utah, Dec. 21, 1910.

[As the article in the JOURNAL stated, the figures given were those reported by Consul A. A. Winslow. The error was evidently made in his office as suggested. —EDITOR.]

Circular Steel Bins

In view of the letter from F. W. C. in the JOURNAL of Aug. 13, 1910, on "Circular Steel Bins," the following quotation seemed of interest. "In any cell which has parallel sides, the pressure of wheat upon the bottom ceases when it is charged up to twice the diameter of the inscribed circle."* If an arching effect occurs with wheat, how much more likely is it to occur with ore? The quotation seems to justify F. W. C.'s contention.

J. R. TOOLE.

New York, Dec. 15, 1910.

Charcoal in the Copper Blast Furnace

In a recent issue of the JOURNAL, noted, in the "Questions and Answers" columns, an inquiry appertaining to the use of charcoal in the blast furnace for smelting copper ore.

A few years ago I was operating a small copper furnace in the mountains of North Carolina, situated nearly 30 miles from the railroad. The haulage charge on coke, from railroad to the furnace, was $35 per ton. There was an abundant supply of excellent oak and chestnut on the ground, and it was decided to determine what could be done in the way of substituting charcoal made at the mine for expensive coke. The wood was cut in cord-wood lengths, and burned to charcoal in earth-covered heaps. Each heap was eighteen feet in diameter, three tiers high. The wood was covered first with leaves over which earth was packed, as is usual in heap burning of charcoal. The burning of the heap required seven days, and each heap produced 1800 bushels of coal.

In using charcoal instead of coke in the furnace, we found it necessary to reduce the blast pressure slightly, on account of the shower of sparks that was thrown upon the feed floor every time the charge doors were opened. A considerable amount of charcoal is ground to dust by the movement of the charge in the furnace, and most of these fines are blown out of the furnace. To compensate for this loss we found it necessary to use a greater weight of charcoal per ton of charge, than coke. The smelting column in the furnace was eight feet deep.

There are many annoyances arising from the use of charcoal in the copper furnace, but occasionally it is only by the use of such fuel that smelting operations can be profitably carried on. It is my opinion that where wood is plentiful for making charcoal and the cost of coke prohibitive, wood-fired reverberatory furnaces would be more suitable for smelting copper ore than a blast furnace using charcoal, unless, of course, there are other considerations making such practice impossible, such as lack of refractory materials, that in one instance I know of, caused a change from reverberatory furnace using wood to blast furnace with charcoal.

New York, Jan. 2, 1911. C. S.

Proc. Royal Soc., Vol. xxxvi, p. 226.

Details of Practical Mining

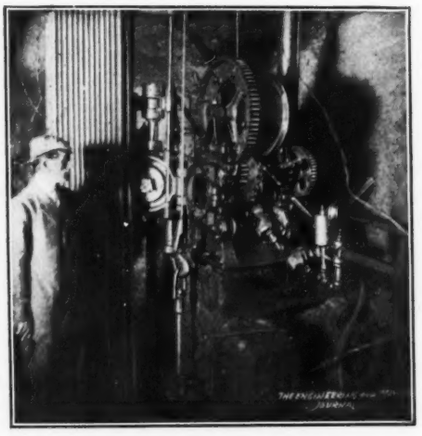
Notes of Interest to Prospectors and Operators of Small as well as Large Mines Things that have to be done in Everyday Mining

Deep Drilling at Mineville, New York

By Guy C. Stoltz*

The boring of a diamond-drill hole to a depth of 1776 ft. was recently completed for Witherbee, Sherman & Co., on their Barton Hill property at Mineville, N. Y. The depth is remarkable since rods and bits of the same diameter were used throughout, cutting a 15/16-in. core, and because the original 16 stones, eight in each bit, finished the hole.

The drilling was vertical to explore beneath the footwall of the present old workings and to determine the thickness of the gneissic and sometimes syenitic ore horizon. A low hanging wall necessitated the hoisting of rods in 20-ft. sections, and at a depth of 1600 ft. hoisting and lowering consumed four hours. A hydraulic clamp recently patented by the drill contractors was used to hold the rods while breaking sections during hoisting and lowering.



Diamond Drill Operating Underground at Mineville, N. Y.

The first 1200 ft. of drilling was accomplished with an air pressure ranging from 50 to 60 lb., and from this depth all rods were hoisted directly by the oscillating drill engine. To facilitate lifting the long length of rods below this depth a traveling sheave was installed making a double draw hoist. The great lengths of unbroken core, showing absence of rifling, speaks well for the stability and steadiness of the machine. The drilling was accomplished with a newly constructed machine designed by the contractors, the Charles Garvey Diamond Drill Company. The question of feet drilled per shift was not paramount, for the machine was operated under variable speed to give it a thorough trying out to learn its capacity and to ascertain any weak points in the mechanical features. A demonstration, at a depth of 1600 ft., was given before members of the Eastern Pig Iron Association who met in the district in July, and the perfect working of the drill brought forth much praise for the machine and the inventors.

*Mining engineer, Mineville, N. Y.

Storage of High Explosives

Realizing the danger from carelessly or improperly storing explosives, mine managers of late years have paid close attention to this subject. Whereas it used to be the common practice to store high explosives in almost any place that was handy and offered no obvious hazard, now one seldom sees this sort of thing. The use of well constructed and artificially heated magazines is now general at American mines, but the lack of standard specifications for construction and materials is still to be deplored for even a costly and elaborate powder magazine, if built according to wrong principles, may be a source of danger.

Commenting on this matter, in the November *Bulletin* of the Mining and Metallurgical Society of America, T. H. Leggett says: "It seems advisable to stipulate the materials of which magazines must be built, and the manner in which they must be guarded by embankment, as in the Transvaal. This would prevent the building of magazines of stone masonry, as cited by Professor Munroe; would afford valuable information for mine managers, many of whom seem to be ignorant on this subject, and would promote the safety of workmen and others living in the vicinity."

The prime requisites of a satisfactory magazine are that it keep the stored explosives dry and at an even, moderate temperature, and that, in case of explosion the magazine should not increase the danger in the vicinity. The first two aims can be accomplished by providing non-heat-conducting walls, good ventilation and artificial heating. By using wood in the construction of the magazines and throwing up earth embankments around them, the dangers from flying fragments in case of explosion are minimized.

In special instances, however, it becomes necessary to armor the magazines so as to prevent their being blown up by vandals in time of troubled labor conditions. An outside sheathing of steel plate will afford protection even from high-power rifles and the danger from the use of such a protective sheathing is far less than from the use of masonry or concrete walls. These should never be tolerated, as the dangers from flying fragments in case of explosion are extremely serious.

Powder Magazine at Morning Mine

At the Morning mine of the Federal Mining and Smelting Company, at Mullan, Ida., the powder magazine is kept at an even temperature of 70 deg. F. by a Richardson No. 15 hot-water heater. The walls are built of concrete, 10 in. thick, and an inside lining of tongue-and-groove planking is provided. The hot-water pipes run along this wooden partition, but are screened off so that no explosives can come into contact with them. A false floor, below which heating pipes are run, and a heavy wooden door with an outside armor of ¼-in. steel are also provided. The method of maintaining an even temperature in the magazine is excellent, but the use of concrete walls is certainly to be condemned.

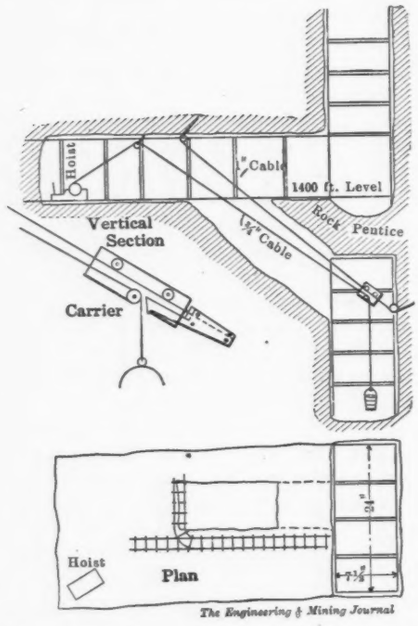
Preventing Live Wire Accidents

R. G. Mackie states (*Journ.* Transvaal Inst. Mech. Engrs., Oct, 1910) that accidents to underground workers caused by coming in contact with live wires or other electrical apparatus, are those which will in the future most concern mining engineers and superintendents. The prevention of these accidents will, when the general application of electric power underground has been accomplished, be the most serious problem to be faced. The large and comparatively ignorant human element forming the bulk of the labor supply will increase the risk of accidents from the above cause to an enormous extent; and for this reason the restrictions placed upon the installation and operation of electrical appliances in the mines on the Rand will have to be a great deal more rigid than in mines where white or other intelligent labor is exclusively employed. As is known, the higher the voltage the lower the initial cost of installation. But if

high voltages, say, 2000 to 3000 volts, are to be carried into these mines, they should only be taken at this pressure to well protected substations for transformation and distribution.

Shaft Sinking at the Pioneer Mine

The vertical shaft of the Pioneer mine, Ely, Minn., is being sunk 200 ft. from the 1400-ft. level. The accompanying sketch shows the method followed in this work. The sinking had to be done without interfering with the hoisting of ore. A station about 25x60 ft. was cut on the 1400-ft. level and an inclined winze started near the center of the station. This winze was extended on about a 45-deg. slope until it intersected the line of the main shaft leaving a rock pentice



SHAFT SINKING UNDER ROCK PENTICE

in the bottom of the shaft just above where the new work was to begin.

After the completion of the winze a 1-in. cable was anchored in the roof of the station and in the side of the shaft extension, as shown. This cable was used as a track upon which a carrier was operated. A small hoist was placed near the farther end of the station, and a one-ton bucket was used for handling the broken rock.

The bucket is drawn up by a ¾-in. cable until the bail strikes the carrier on the stationary cable. The carrier then conveys the bucket to the station where it is emptied into a car and trammed by hand to the shaft and hoisted on the man and timber cage, thus not interfering with the hoisting of the ore. The shaft is 7½x24 ft. with four compartments.

The Azimuth Method in Mine Surueying

BY WILLIAM F. BOERICKE*

The essentials of good surveying practice are accuracy, completeness, and speed. To attain accuracy in angle measurements there are two excellent methods, each of them depending on doubling the value of the angle read. The horizontal angle alone may be read and doubled, or the deflection angle may be turned off and doubled, with telescope direct and inverted; the latter being the favorite with railroad surveyors. In each case the vernier is brought to zero at every setup; thus every angle is independent of the preceding.

For all important work underground involving connections of long extent, and where time is of less importance than extreme accuracy, these are the only methods to be used in angle measurement. Usually, a mine surveyor must work under pressure, and cover a large amount of ground in a short time. He often has to work while active mining operations are going on; loaded cars are rushing past him; if one of his stations is above the track, the shiftboss stands around with a worried look, while the tramming is held up. Possibly he wants to "squib" a few holes in the heading, and time is limited. In such cases the surveyor must use the quickest method consistent with accuracy. Unless he is fortunate enough to have two helpers to provide his sights without running back and forth, he will find the extra time needed to "double sight" is a serious handicap. Particularly is this the case if the instrument must be brought into a different focus for each sight.

CHECK AS MANY ANGLES AS POSSIBLE

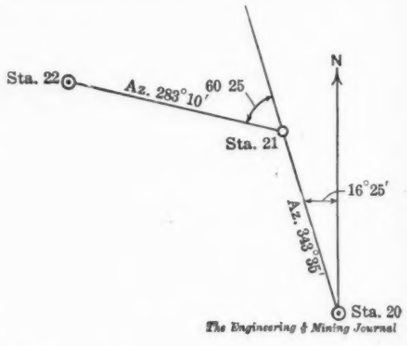
Whether or not he should take single sights without attempting to double the angle for a check is a question his judgment and experience must decide. A good working rule is to check all angles where there is no possibility of closing the traverse. Where the traverse closes, and time is an object, take but one reading. The office calculations will show whether the survey closes within a reasonable degree of accuracy, and a check on the angle reading is obtained at the last setup.

Of course, any of the methods referred to may be used for single angle readings. But the azimuth method processes distinct advantages over all. No calculation whatsoever is needed, whether in the field or the office, to arrive at the true azimuth, and hence the true bearing, of a line. This eliminates any chance of error in subsequent plotting, and saves time as well. Another advantage is that in regular work, where no side shots are taken, it is not necessary to reset the vernier at each setup, the previous reading remaining unchanged for the backsight. This again saves time, and eliminates possible errors in setting the vernier.

*Mineral Point, Wis.

AZIMUTH AND OTHER METHODS COMPARED

Possibly the convenience of the azimuth method may be illustrated by a typical page of field notes. The instrument is at station 21, backsight on 20, foresight on 22. The bearing of the line 20-21 is north 16 deg. 25 min. west; hence the azimuth will be 343 deg. 35 min. With the ordinary method of measuring the angle the vernier would set at zero, and the angle between 20, 21, 22 measured clockwise. The notes would be: Station, 20 (21) 22; angle, 119 deg. 35 min.; double angle, 239 deg. 10 min.; true angle, 119 deg. 35 min.; magnetic bearing, N 77 deg. W.; length, 67.36 ft. To obtain the azimuth of 21-22 from these notes a calculation is necessary. While this may be done in the office, it is



BEARING DETERMINED BY AZIMUTH READINGS

frequently desirable, perhaps necessary, to get it at once. The calculation is made on the margin of the note book (often with the dripping water from a wet roof making the notebook a mass of soggy pages) and would be:

Azimuth, 21-21.....343 deg. 35 min.
Back Azimuth, 21-20.....163 deg. 35 min.
Angle, 20-21-22.....119 deg. 35 min.

Azimuth, 21-22.....283 deg. 10 min.

This he would reduce mentally to bearing to check with his needle if he uses it.

The deflection angle method is no better in saving time. The notes under the same conditions would read: Line, 21-22; deflection angle, L 60 deg. 25 min.; deflection angle doubled, L 120 deg. 50 min.; true deflection angle, L 60 deg. 25 min.; magnetic bearing, N 77 deg. W.; length, 67.36 ft. To get the azimuth from this:

Azimuth, 20-21.....343 deg. 35 min.
Deflection angle, 21-22.....160 deg. 25 min.

Azimuth, 21-22.....283 deg. 10 min.

There is the further disadvantage that whenever the deflection angle exceeds

45 deg., the doubled angle, when the circle is numbered in quadrants, is troublesome to read.

With the azimuth method, the vernier being set at the azimuth of 20-21, the resulting azimuth would be read off directly, and the only notes would be: Line, 21-22; azimuth, 283 deg. 10 min.; magnetic bearing, N 77 deg. W.; length, 67.36 feet.

Instrument Adjustments

In the azimuth method, the chief precaution needed, aside from a thorough acquaintance and experience with the instrument, which is presumed, is that the line of collimation should be absolutely correct. Unless it is, a constant error is introduced, every time the telescope is plunged in taking the foresight, and accurate work is impossible. Before starting any work with the azimuth method the vertical crosshair should be tested. This takes but a few minutes, and should never be omitted. With the best instruments, only a serious shock or jar will throw the collimation line out, and once properly adjusted, will remain in good order for months.

When local attraction is absent, the needle is a good check on the azimuth. In underground work is is usually unsatisfactory, on account of tracks, drills, wires, etc. On the whole it is worth while to read it. A glance does the trick, and it serves to detect gross errors of reading. It is, of course, foolish to try to read closer than degrees, unless 20 or 30 ft. away from iron, which rarely happens underground.

In practice it is often better to run through the stations first, locating them with all possible accuracy, and then return for the sideshots, making another round. It often happens, however, that the two must be taken together. In such cases the azimuth method is convenient. After taking the azimuth of the new station, the vernier is already set, and sideshots may be taken immediately without further delay. When they are completed, a check foresight may be taken on the new station, which should be the same as the one previously read. This serves the double purpose of checking all work, and automatically setting the vernier for the next setup.

Were the other methods employed, no less than three separate backsights would be needed—two for the doubled angle, and one when starting the sideshots.

Careful Taping Necessary

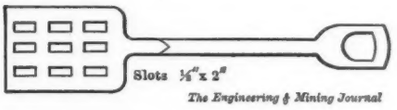
It is not uncommon to see a surveyor measure his angles with the utmost care, and then tape his distances to the nearest tenth, or permit a careless helper to take the reading. Such a policy is, of course, inconsistent. The deviation for an error of one minute in reading an angle is about 0.03 ft. in one hundred feet. With ordinary care and experience, the probable error of a single angle reading would be considerably less than this, and if the collimation line is in adjustment, the error would be compensative. In taping 100 ft., however, it is easy, by slightly varying the pull, to make a difference of 0.05 to 0.10 ft. This is especially the case in taping between overhead stations, where the tape is off the ground. The errors here also tend to compensate, but the time spent in doubling angles to fine limits could often be profitably spent on the more prosaic work of taping.

Shovel for Concrete Work

By S. Clarke*

The accompanying sketch illustrates a convenient tool for obtaining a smooth finish on concrete work, doing away with the necessity of grouting.

The tool is made from an ordinary molder's shovel, flattened out, with 9



Shovel for Use in Concreting

slots, ½x2 in., cut in it. By running the shovel down the inside of the form and working it toward the center, the large pieces of rock and gravel are pushed in from the form, while the grout will run through the slots to the sides of the form, leaving a good finish.

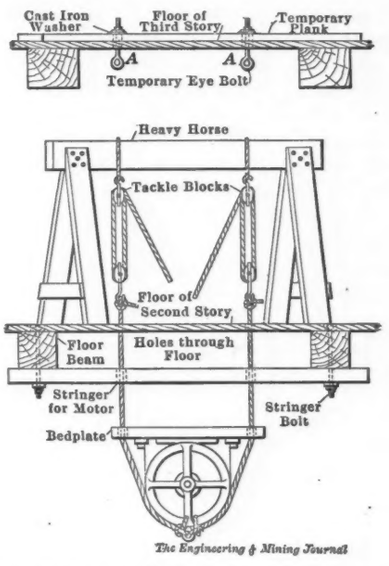
The Sweeper Should Have Been Promoted

It happened at one of the power plants in a coal-mining town, writes W. H. Keller in *Power*. Two alternating-current generators were running in parallel to supply power to operate the mining machinery. The alternators were driven each by a horizontal cross-compound engine. One of the low-pressure cylinders became disabled, making it necessary to stop the engine, and the engineer hastily shut the throttle without disconnecting the generators at the switchboard. The generator of the disabled engine kept revolving, of course, taking current as a motor from the busbars. The engineer sent his assistant to shut off the valve in the steam line in the boiler room, but the engine would not stop. Then the engineer sent for some bars and timber, intending to use them to brake the flywheel in order to stop the engine and generator. An Italian, who was employed as sweeper in the engine room, was watching all the time but said nothing until he saw the men about to "brake" the engine; then he touched the engineer on the arm and said: "Mister, pulla da switch, pulla da switch." This corrected the trouble. The engineer has moved.

*Mining engineer, Leadwood, Mo.

A Method of Raising Inverted Motors

There are many methods of raising an inverted motor to a position on a ceiling. The method described by H. T. Boynton in the *Electrical World*, Nov. 3, 1910, will be found excellent under certain conditions. The accompanying illustration shows how the tackle is arranged. The inverted motor is raised with two ropes. Each passes through a foundation-bolt hole in the bedplate, is arranged around the motor frame and



Method of Hoisting an Inverted Motor

made fast in the eyebolt at what is normally the top of the motor. The two holes in the bedplate through which the hoisting ropes pass are at diagonally opposite corners. The hoisting ropes, after being made fast to the motor, are threaded through two of the four holes which have been bored to accommodate the bolts in the stringer pieces which will support the motor. Then the ropes are carried through two accurately located holes in the floor above. On this floor rests a horse which supports the two sets of blocks with which the motor is raised. Sometimes instead of using a horse to support the tackle, it is best to arrange temporary eyebolts in the floor of the story next above as shown at ***A*** and ***A***. After a motor has been raised to its position on the stringer planks, two bolts are inserted through the open holes and set up tightly. Then the hoisting ropes are pulled out and the other two bolts inserted. It should be noted that with this method it is not necessary to cut any large holes in floors.

Types of Skip Dumps

By J. K. Hudson

The article by Mr. Stoltz that appeared in the Dec. 10 issue of the Journal recalled to my mind a number of automatic skip dumps used in various mines I have visited. At the Pittsburg-Silver Peak property, Blair, Nev., ore is discharged from the mine and opencut working through a "flat raise" to the main haulage tunnel. At the bottom of this raise the tracks are arranged as shown in Figs. 1 and 3 of Mr. Stoltz's article. The rear wheels of the cars have wider flanges than the front ones, and engage the upper track, and the cars are thus tilted and emptied. The same scheme is employed to dump the cars used in some of the flat raises in the mines at Grass Valley, Cal., in which "go-devils" or gravity inclines are operated. In this latter instance, however, the upper tracks on which the rear wheels run are usually laid horizontal and end at a buffer. At the iron mines of the Tennessee Coal, Iron and Railroad Company, on Red Mountain, near Birmingham, Ala., the identical dump illustrated in Fig. 3 is used on the tipples. The skips at these mines hold 10 tons of ore and this type of dump has proved the most satisfactory of any tried. At other Red Mountain mines where cars of small capacity are used, various types of side and end revolving tipples are used.

A scheme somewhat similar to those shown in Figs. 2 and 4 has been used at a number of mines on the Mother lode of California. The skids or track is cut away, as shown in Fig. 3, so that the front wheels, which are provided with narrow flanges, take the flat track, while the rear wheels continue up the regular track. The track is spread at the point where the skids are cut away, so the rear wheels must have wide flanges. In special cases in order to enable the skips to be hoisted above the dumping point, I have seen an arrangement used in which the portions of the skids that are cut away are hinged to the frame so that the loose sections can be turned back when skips are to be dumped, or swung back into their original position when it is necessary to hoist skips above this point.

The arrangement illustrated in Fig. 5 of Mr. Stoltz's article is that of the ordinary Kimberley dump. At the Kennedy mine, at Jackson, Amador county, Cal., an improvement of this idea is used by which the necessity for lugs on the skips is obviated. In place of having the "plate-dump roller," indicated at *D*, which engages the horns *C* on the skip and thus makes it possible to further elevate the bottom of the skip, two hooks of flat iron, spaced about two feet apart, are hung from the headframe so as to engage the lip of the skip as it is tilted by the curved tracks. These hooks support the skip while the bottom is being raised, just as does the bar on which the horns catch in the skip used at Port Henry. As the hooks are free to swing there is less jar on the skip when they are used than is usual with the ordinary device.

Miners' Cottages

The accompanying halftone shows the type of cottage which prevails in all of the mining camps owned and controlled by the Cleveland-Cliffs Iron Company, Ishpeming, Mich. The houses are built for two families, on the center line of a 100x150-ft. lot. Each apartment is about 18 ft. wide and contains five rooms. There is ample space between the houses so there is no such thing as crowding. Wherever possible the native trees have been preserved to make the places attractive. The lot is sufficiently large for a garden spot in the rear. Water is piped into the houses and a drainage pipe connects the sink with a cesspool, or sewer, depending upon whether the "location" is a new or old one. The company maintains these cottages in good condition and repapers them occasionally as the tenants may desire, providing the tenants pay for the paper. The rental for these cottages varies from $7 to $8.50 per month.

Miners' Cottages Built by the Cleveland-Cliffs Iron Company, Ishpeming, Mich.

Flux for Cupel Bottoms

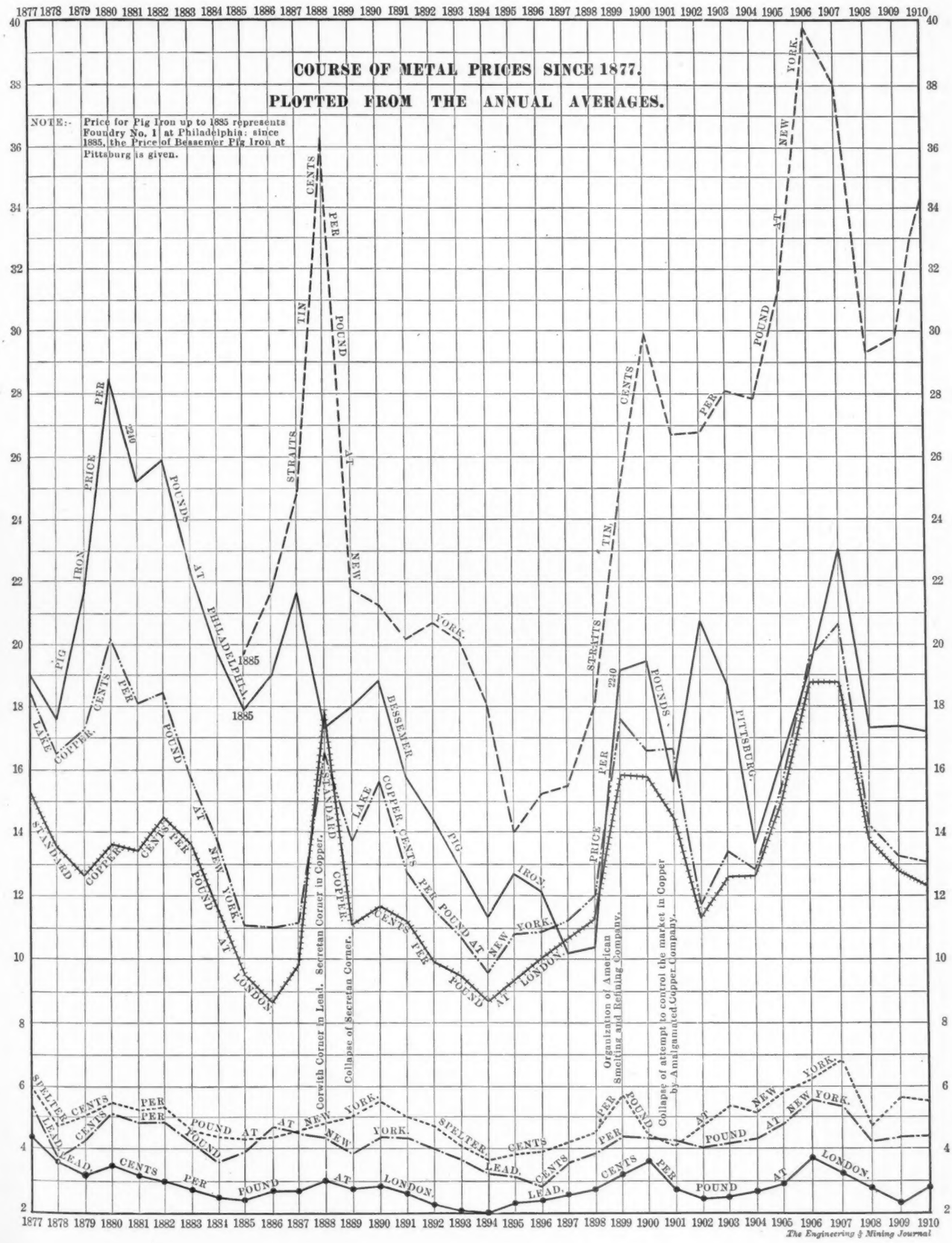
The fluxing of old bone-ash cupel bottoms and similar material is an expensive matter as ordinarily practised, if any great amount of material is to be melted down, as the usual flux for this purpose is composed of half soda and half borax glass. As a substitute a mixture of half soda and half finely ground fluorspar has been suggested, which is a much cheaper mixture, and said to be equally effective. A blank test on several assay tons of the fluorspar in order to determine whether it carries any recoverable amounts of gold and silver should be run before using the material in assay work. In case the fluorspar is to be used for smelting down the residues from actual operations in gold or silver refineries, the presence of gold or silver as impurities in the fluorspar would be of advantage.

Frozen Dynamite

The nitroglycerin in dynamite freezes at 42 to 46 deg. F., and when frozen is insensible to detonation but explodes readily by friction or by breaking or cutting the cartridge. It should be thawed by putting it in a watertight case and immersing in warm water, or by laying it in a warm room. It should not be thawed by putting the sticks in warm water, as one loses a certain amount of the nitroglycerin through its coming out of the cartridge and floating on top of the water. This water is likely to be heated again, in which case the floating nitroglycerine is likely to explode. It should also be noted that in case any water does have nitroglycerin floating on its top that the water should be poured out carefully and not thrown out violently on the ground. It is also dangerous to hold a stick of frozen dynamite over a hot object, as one drop of the nitroglycerin may ooze out, fall, explode and set off the stick. It is hardly necessary to state that it is imprudent to thaw dynamite by carrying it down one's boot leg or inside one's shirt. There are only two safe ways and those are the ones given above, and those should not be pursued too enthusiastically. Make haste slowly.

A new indicator, a-naphtholphthalein, is described by Sőrensen and Palitzsh. It is prepared from a-naphthol and phthalyl chloride. In strong acid solutions it is almost colorless; in feeble acid, red; in weak alkalis, green; and in strong alkalis, blue.

Average Yearly Prices of the Metals


COURSE OF METAL PRICES SINCE 1877.
PLOTTED FROM THE ANNUAL AVERAGES.
NOTE:- Price for Pig Iron up to 1885 represents Foundry No. 1 at Philadelphia; since 1885, the Price of Bessemer Pig Iron at Pittsburg is given.
PIG IRON PRICE PER TON AT PHILADELPHIA
1885
LAKE COPPER CENTS PER POUND AT NEW YORK
STANDARD COPPER CENTS PER POUND AT LONDON
STRAITS TIN CENTS PER POUND AT NEW YORK
Corwith Corner in Lead.
Secretan Corner in Copper.
Collapse of Secretan Corner.
BESSEMER PIG IRON PRICE AT PITTSBURG
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The Engineering & Mining Journal

Edward Balbach, Jr.

Edward Balbach, Jr., president of the Balbach Smelting and Refining Company, at Newark, N. J., died of pneumonia, after a short illness, Dec. 30, 1910, in his seventy-second year. He was born at Carlsruhe, Germany, July 4, 1839, and as a boy came to this country with his father, the late Edward Balbach, who may be considered the Nestor of the gold and silver-lead smelting industry in the United States, and who located at Newark, starting there in the refining of jeweler's sweeps and similar old material, soon branching out into the smelting business. Edward Balbach, Sr., who was born in 1804, was a proficient chemist and had been engaged in the smelting and refining of metals at Carlsruhe in Baden, his native city. In 1848 he came to this country to look over the prospects of the smelting industry here; and in 1850 he returned to settle here permanently, bringing his son with him. His refining works, as established at Newark, was soon extended to do smelting work also.

From data available, it appears that the first lead-silver ore came to the works from the Erie mine, in Orange county, New York, in 1859, and was soon followed by larger consignments from other States, as well as from Mexico. The earlier silver-lead bullion shipments from Nevada, Utah and other parts of the West were divided between the Balbach works and the Selby works, at San Francisco.

The methods for treating this material were both expensive and inadequate, but in 1864, Edward Balbach, Jr., introduced a great improvement in the desilverizing process, which revolutionized the methods theretofore employed. The practice was to soften the lead first in a reverberatory furnace, followed by a liquating furnace; then desilverize by addition of zinc in a kettle; separate the gold-silver-zinc-lead alloy by liquation in a special furnace; refine the desilverized lead by heating in a reverberatory furnace, drawing it off into a market kettle and molding in 100-lb. pigs; distilling the gold-silver-zinc-lead alloy in a tilting retort, invented by A. Faber du Faur, condensing about 50 per cent. of the zinc for further use and obtaining from the retort a rich gold-silver-lead bullion, which was cupelled. The important modification was the distillation of the zinc crust.

This method, which became generally known as the Balbach process, was highly successful, and in a short time the smelting of lead ores and refining of lead bullion became an important feature of the works, and in 1864 Edward Balbach, Jr., was admitted to partnership in the firm of Edward Balbach & Son. The refined lead then produced by the works, together with what came from the Selby works in San Francisco, constituted the only domestic supplies for some time and large quantities of refined lead continued to be imported from Europe.

Besides introducing the desilverizing process now generally adopted, Mr. Balbach devised a great many other improvements in the treatment of smelting products, as, for instance, retorting furnaces, tilting furnaces and the utilization of water jackets, etc. The works' present output of refined lead is among the largest of any one plant in the United States and ranks with the very highest in quality. The practice of the Balbach plant became the standard for the highest efficiency and most effective work. From time to time the plant had been extended and enlarged, to meet the needs of its growing business.

One of Mr. Balbach's notable achievements was in 1881 when, assisted by his

EDWARD BALBACH, JR.

able engineer, F. A. Thum, he built the first commercial plant in this country for the refining of copper by electrolysis, thus paving the way for an industry which has grown to tremendous proportions in the United States, far surpassing the total production in any other country.

Edward Balbach, Sr., died in 1889, and soon thereafter Edward Balbach, Jr., organized the Balbach Smelting and Refining Company, at Newark, enlarging and completely modernizing the works. He may be considered as a born chemist and metallurgist, and was never slow to profit by new inventions, adapting and applying them with success to the needs of the works, in connection with the improvements already noted as the result of his own studies and genius. At the same time, he always remained the practical smelting man, who had studied and learned the business from the bottom up, with a tireless energy and zeal, setting a constant and good example to the younger generation by presence at his post both early and late.

What endeared him to his business associates and friends was his kind and cheerful disposition, combined with a straightforward character marked by a modest and unassuming manner, notwithstanding which he possessed force and the faculty to carry his ideas through to a successful end. He recognized in those around him every worthy effort in the direction of self-improvement and strove to assist every honest endeavor.

Mr. Balbach ranked as one of the oldest and best known metallurgists in the United States, who always kept abreast of the times and who will be missed not only by his immediate associates, but by the entire profession in which he held so prominent a place.

American Smelting and Refining Company

Stockholders of the American Smelting and Refining Company, at a special meeting, Jan. 5, voted to increase the capital stock from $100,000,000 to $115,000,000, the increase being in the common stock. Stockholders also approved the plan to issue $15,000,000 six per cent. convertible bonds of the American Smelters Securities Company, which will be convertible into American Smelting and Refining common stock when the bonds sell above par. The increase in the common stock of the American Smelting and Refining Company is to provide for the conversion of these bonds, which are offered to stockholders at par.

The number of shares voted in person or by proxy was 402,207 out of the total of 500,000 shares of the preferred stock and 398,663 out of the total of 500,000 shares of the common stock. The whole vote is reported to have been in favor of the plan of the management. It was stated that the holders of preferred stock are now nearly 7500 in number.

Daniel Guggenheim, president of the American Smelting and Refining Company, said he felt greatly flattered at the extraordinary amount of interest shown by the stockholders of the American Smelting and Refining Company in the proposed financial scheme, and desired to extend to them, not only his congratulations on the completion of this plan, but also to thank them for their interest and assent.

A provision is now inserted in cases of public lands granted by the Canadian government for petroleum purposes to the effect that if the petroleum or its products should at any time be required for the use of the Canadian navy, the Government shall have the right of preëmption at a price to be agreed upon between the parties, or in case of difference, to be fixed by the exchecquer court.

Calumet & Hecla Consolidation

The Calumet & Hecla Mining Company has sent to stockholders a plan for a consolidation of the Lake Superior properties which it controls. It is proposed to form a company under the laws of Michigan, with a capitalization of 400,000 shares, with a par value of $25 per share. A special meeting of the stockholders will be held on March 9, to act on the proposal. The terms offered to stockholders in the different companies are shown in the accompanying table.

The holdings of the Calumet & Hecla in other companies are such that each stockholder of the Calumet & Hecla Mining Company will receive in exchange for each share of the Calumet & Hecla stock, 2.4 shares of stock in the consolidated company. The Gratiot Mining Company and Isle Royale Copper Company, being organized under the laws of New Jersey, cannot take advantage of the Michigan statute, under which the consolidation will be effected, but these companies may be brought into the consolidation.

Plan for consolidation of Calumet & Hecla properties proposes to form a new company with a capitalization of 400,000 shares with a par value of $25 per share. Consolidation will make it possible to dispense with many shafts, thereby reducing maintenance costs.

Under one management the products of all the mines can be treated together instead of smelting and refining small lots from each mine as is now the practice. Duplication in shafts, machine shops and mills can be avoided. Good ore on certain properties will become immediately available as it can be approached from the shafts of adjoining mines.

Conditions of Mining

There are three lodes, known as the Calumet conglomerate, the Osceola amygdaloid, and the Kearsarge amygdaloid. They dip at an angle of approximately 37 deg. in a northwesterly direction, always spoken of as westerly, and as a result, each lode crosses any given piece of property in an inclined plane, that lies near the surface on the easterly side of the property and gradually increases in depth as it approaches the westerly side. The Michigan mining laws limit the rights of each owner to the ground perpendicularly below and within the surface boundaries. Consequently, the owner of the outcrop must cease his operations upon the lode when the underground workings reach his western boundary, and the owner of property west of the outcrops must sink vertically through barren ground to reach the lode. Under the present system of separate ownership it has been deemed impracticable for two companies owning adjoining ground to use the same shaft at the same time. This results from the practical impossibility of keeping the ore of the two companies separate, the difficulty in properly apportioning the operating charges in making rules for the equitable use of the shaft equipment, and in solving other similar problems.

	Present Stock Issue.	Allotment of New Stock.	Ratio of Exchange.
Seneca	20,000	6,000	30–100 shs. new stk. for 1
Ahmeek	50,000	40,000	80–100 shs. new stk. for 1
Allouez	100,000	17,000	17–100 shs. new stk. for 1
Osceola	96,150	48,075	50–100 shs. new stk. for 1
Centennial	90,000	5,400	6–100 shs. new stk. for 1
Tamarack	60,000	13,200	22–100 shs. new stk. for 1
Laurium	40,000	4,000	10–100 shs. new stk. for 1
La Salle	302,977	6,059	2–100 shs. new stk. for 1
Superior	100,000	18,000	18–100 shs. new stk. for 1
Cal. & Hecla	100,000	170,834	
Total new stock	.....	328,568	.....

It is possible under a system of friendly coöperation for one company to use a disused shaft of another company, but not a shaft in active use. Often this means that ore must be taken out through a distant shaft, when there is another and nearer shaft belonging to a neighbor that could be used to advantage, and sometimes means the expense of getting at the ground is so great that the rock cannot be taken out at all. Under consolidation unnecessary duplication of shafts and their equipment can be avoided, and the ground can be mined comprehensively and to the best advantage. Under the present conditions a mine containing low-grade ore is confronted with a disagreeable alternative when the price of copper is low. It must either waste its resources by operating at no profit, or even at a loss, or shut down, and every shutdown means a large direct expense, and still greater indirect loss in the disorganization of the operating force.

Benefits of Consolidation

Under a consolidation it will be possible at small expense to discontinue operations in poor ground when the price of copper is low. The mining force can be transferred to another part of the property without impairing its efficiency. The relative expense of development work in all mines will be less under consolidation. It is now necessary to stamp, smelt and refine the product of each company separately, handling many small lots, thereby losing the benefit of all the economies that can be practised in handling large lots.

There are now many instances where a company faces the alternative of using its own mills for ore, for which the mill is not adapted, or sending its ore to some other mill, if one with fair capacity is available, and paying the additional charge incidental to keeping its product separate.

Often there is no mill with spare capacity available. Consolidation will do away with this difficulty, and by comprehensive handling of the different classes of ore make it possible, not only to secure a higher recovery of the copper content, but also to maintain a uniformly high grade of copper, all at less expense. As the amount of copper contained in the ore grows less, an increasing proportion of the cost of the finished product is the item of transportation of the ore from the mine to the mill. The necessity of keeping the product of the several mines separate in the mill makes it impossible to adopt a really comprehensive plan of shipping to the nearest mill equipped to handle that class of ore. In addition, the large areas of ground developed on the Kearsarge lode to the north, warrant an increase in the stamping capacity. If the various companies were all under one organization, a large saving in freight could be made by building a new mill in a convenient location instead of erecting additional stamps at the present mills. Under the present system it has proved impracticable to do away entirely with unnecessary duplication of equipment. There is no necessity of continuing to maintain all the blacksmith and carpenter shops, now scattered over the many mines. All such work under a consolidation may be centralized, and the same principle applied to the purchase of supplies. It will be found possible to effect economies by

centralizing the power plants, apportioning a general water supply to each mill according to its needs, and placing all the mines and mills under one general management.

MINES INCLUDED IN THE CONSOLIDATION

The following is a list of the mines that will be included in the consolidation, with a synopsis of the benefits that will accrue to each:

Calumet & Hecla—This company owns an extensive and efficient plant, including large mining equipment, shops and stamp mills adapted to the treatment of the ore found in the immediate vicinity. Even after exhaustion of its orebodies this company's equipment would be a large asset.

Gratiot—The ore is very low grade on this property and on account of its small area, reduction of costs cannot be effected by extending the scale of operations.

Seneca—The ore of this mine is low grade but it has no mill. Under one organization the property can be developed from the Gratiot shafts, eliminating two of the three Seneca shafts.

Ahmeek—This company has considerable ore developed and expects to produce good ore for many years to come. New crushing plants are needed at the shafts of this mine, which, if built by the company alone, would necessitate a suspension of dividends for several years.

Allouez—By consolidation good ore in the Allouez becomes immediately available as it can be reached by the No. 1 Ahmeek shaft. From the No. 1 Allouez shaft it is but a short distance to good ore in the Osceola mine, just to the south. Working independently, the Allouez and Osceola companies would have much drifting to do before reaching this ore from their own shafts.

Osceola—This property is well equipped and owns a large block of ground through which the Kearsarge lode passes, that can be reached from the La Salle and Laurium shafts for a fraction of the expenditure that would be necessary for sinking at least two new shafts on the Osceola. There are large blocks of ore in the mine that cannot be reached without sinking these new shafts but, which could be worked from shafts on the adjoining properties. and also certain Osceola shafts can be used to reach ore on adjoining claims not accessible from the shafts of the owners.

Centennial—The ore on the Centennial is low grade. and while low prices for copper prevail, operations would have to be suspended. Such ore as would be taken out during times when copper brings a better price could be cheaply raised through one of the Osceola shafts.

Tamarack—The mine of this company is well equipped, but being very deep, the ventilation is bad and the copper content of the ore constantly decreases with increasing depth. The mill is not adapted to conglomerate ore and at present Tamarack ore is going to the Calumet & Hecla mill. The Calumet & Hecla mine adjoining the Tamarack, and the Tamarack mine, are so deep that the crushing pressures are great, and should one of these mines take out the ore near the boundary of the other before the other mine began taking out ore similarly situated, there would be great danger of losing part of the ore in the latter ground by crushing in of the walls.

Laurium—This property can only be profitably worked through connection with the Calumet & Hecla.

La Salle—The developments on the Kearsarge lode on this property had been disappointing, although it is too early to condemn definitely the large area of unexplored ground to the south. The property is in need of extensive development.

Superior—This mine is handicapped by its distance from the mill. Under consolidation the charges for ore transportation could be greatly reduced by using the near-by mill of the Isle Royale.

Isle Royale—Sooner or later this company must face the necessity of closing down when low copper prices prevail. The best interests require that the operations shall be restricted or increased with fluctuations in the price of copper. The Isle Royale mill can be enlarged, and the washing equipment modified so as to be suitable for the economical treatment of Superior ore.

California Oilfield Maps

The State Mining Bureau of California has just issued, under the direction of Lewis E. Aubury, State mineralogist, a map of the oilfields of Santa Barbara county, and a detailed map of the Santa Maria and Cat Cañon oilfield. The price of the Santa Barbara county map is 40c., and of the Santa Maria and Cat Cañon map is 50c., with 5c. postage for each. A map of the Whittier-Olinda oilfield, in Los Angeles and Orange counties was issued recently.

In all the maps that have been completed, railroads, highways, producing, nonproducing and drilling wells, are correctly shown. Field assistants are now at work in a number of the other districts collecting data for detailed maps. Every oil region in California that has been developed, or that has immediate promise of development, will be mapped by the State Mining Bureau as early as possible.

According to French advices a nitride of aluminum, Al_2N_2 can be prepared by submitting pulverized aluminum to the action of ammonia gas at 850 to 1000 deg. Centigrade.

Some Thermal Properties of Concrete

The coefficient of linear expansion for 1:2:5 stone concrete has lately been determined by Prof. Charles L. Norton of the Massachusetts Institute of Technology[1]. It is 0.0000055 per cent. per deg. F. at low temperatures, increases slightly up to 575 deg. F., after which it decreases until it becomes zero at 1500 deg. F. It is slightly negative above this point. The blocks had a permanent elongation of about 75 per cent. of the maximum elongation after being once heated to 1500 deg. F., but on a second heating, there was no sensible permanent elongation.

Blocks heated to 932 deg. F. for two hours lost 15 per cent. of their strength; after four hours, 43 per cent. Heated at 1500 deg. F. for two hours they lost 38 per cent.; after four hours, 66 per cent. The specific heat was also measured, giving results from 0.156 to 0.219. Stone concrete will conduct heat about 25 times as fast as does compressed cork, but only about 1/75 to 1/100 as fast as steel.

New Water Power Regulations

WASHINGTON CORRESPONDENCE

A new form of water-power permit and new regulations for water-power plants on the national forests were approved Dec. 29 by the Secretary of Agriculture. The important changes under the new regulations are, that they may provide for the issuance of a preliminary permit that secures for the party making the first application, protection during the time necessary to make final surveys and procure data for the issuance of the final permit. The new permits will terminate at the expiration of 50 years, unless revoked sooner by the Secretary of Agriculture, and the charge will be based upon the net horsepower capacity of the plant, beginning with a charge of 10c. per h.p. during the first year and that will be increased 10c. per year until $1 per h.p. will be paid in the tenth year, which charge will continue thereafter. Computed for the 50-year period, the charge under the new permit is about 30 per cent. less than that under the old form. Provision is made for a readjustment every 10 years, of the factors upon which the estimated capacity of the plant is computed. It is alleged by the officials in charge that the new regulations will encourage extensive water-power development in the national forests under provisions that will fully protect the interests of the people.

[1] *Engineering News*, Vol. 64, p. 711.

Development of the Goldfield Mines

By Claude T. Rice

The leasing system of the early development period is now on the decline, the companies preferring to do their own prospecting. Good ore has been found at a depth of 1000 feet. The productive mines occupy a comparatively small area; the most important properties are the Goldfield Consolidated and the Florence, the former producing about $10,850,000 per annum.

In describing Goldfield, Nev., it is hardly necessary to go over the early history of the camp when the leasers were prospering. But it must be admitted that it was the leasers who made the camp in the beginning. Leasing is on the decline, partly because the two larger companies prefer to do their own prospecting, and partly because it is hard to raise money for Nevada ventures. With the exception of the Grizzly Bear lease, the shaft of which is 1165 ft. deep, the Goldfield Consolidated company does not have a single lease out. The Florence property likewise has no leases in existence. The few operating leasers are working mainly on outlying properties. The Silver Pick has one lease in operation, while on the Polverde claim of the Jumbo Extension another leaser is working at a depth of 1065 ft. The conspicuous feature, and the encouraging part of the present leasing, is that the leasers prefer prospecting at considerable depth, where the orebodies appear to become more regular and better outlined, rather than to drift near the surface in the attempt to find ore in the upper parts.

To its credit, Goldfield now has a mining company that publishes in its reports the most information about its financial condition and the progress of underground work that is given by any mining company not incorporated in England. Moreover, the Goldfield Consolidated is one of the few mining companies in which the man who has been most interested from the beginning still holds the largest interest. In fact, George Wingfield is one of the few men who, after making money out of a mine, remained with it as an investment. His connection with Goldfield Consolidated is a good guarantee that the small investor will get the same fair treatment that he has in the past.

Western Federation and High-grading Dead at Goldfield.

At Goldfield much has been done to break up the control of the bad element in the Western Federation. The home of high-graders is now practically free of that element, which has drifted to California, Cripple Creek and the San Juan country of Colorado. Instead of the officials of the Goldfield Consolidated company having to waste their energies in the contest with ore thieves, they are able to devote their attention to the safeguarding of the lives of their employees. The Goldfield Consolidated is one of the few mines in the country where a miner is discharged as quickly for working in an unsafe place as he is if he does not do enough work.

Productive Mines Occupy Small Area.

The Goldfield mines that give promise of a future, and all those that are working at present, are grouped closely together. They are situated roughly in an east and west zone that extends easterly from Columbia mountain about one mile, to the farthest stopes of the Florence mine, Fig. 1, shown in the panorama taken from Columbia mountain by the headframe that stands on top of the hill beyond the Florence mill. This picture views the mines from an unusual direction, but it gives a good idea of the comparatively short extent of the productive area at Goldfield. Many of the shafts shown are merely prospects. The more important ones can be recognized by the large dumps. Beginning at the east and naming the mines that have produced on a large scale, they are the Red Top at the foot of Columbia mountain, the Laguna, the Jumbo worked by the Clermont shaft, the Mohawk, the Combination Fraction, the Combination and the Florence. The zone-like occurrence of the ore is still more emphasized by Fig. 2, which was taken from a point southerly from the Combination shaft, showing the mines as generally viewed from town.

Geologic Conditions

The country rock at Goldfield consists of a series of Tertiary volcanics laid down on top of a basement of Cambrian sediments into which was intruded, prior to the volcanic extrusions, an alaskite mass. The older sediments and the alaskite crop out on Columbia mountain, near the mines, while in some of the deepest workings of the Jumbo and Polverde fraction this shale is also found. The volcanic rocks overlying the older basement consist of rhyolites, latite, dacites and andesites that have been folded into a low dome.

Through this mass of volcanics there extends a crescent zone of fissuring that has a roughly northwest-southeast course, with the horns of the crescent pointing to the southwest. Along this crescent there appear to be three places where there was ore deposition. The most important is that portion extending from the Florence to the Red Top mine, the center of which seems to be in the Mohawk and Jumbo ground, although the most definite orebodies are in the Florence mine near the south end of the zone. At the Sandstorm and Kendall mines some ore has been mined, but this was from workings less than 80 ft. deep and in the rhyolite. So far the attempts to trace this ore to greater depth have met with no success. A company has been organized by George Wingfield to work the ground in that vicinity during

Principal Mines in the Productive Area, Goldfield, Nev.

the coming spring. At Black Butte there is an area in which some patches of rich ore have been found. This part of the camp has given but little return for the work done. The country rock is andesite.

As the bonanzas are found mainly in the dacite, it became a saying in the camp that the dacite was the only rock favorable to the discovery of deep-seated orebodies, although it is well known that some of the richest ore from the Little Florence and the Engineers' lease was in andesite.

The experience with deeper development shows that the orebodies continue unaffected by the change from the dacite into the latite below, although it is thought by some that possibly the ore in the latite is a mineralization of a dacite dike that cuts through the latite. This theory is not generally accepted.

Good Ore Found in Latite

A body of copper-bearing sulphide ore in latite occurs on the 800-ft. level of the Polverde fraction. It is said to be about 2 ft. wide and to average about $30 in gold per ton. All the ore in the Clermont workings of the Goldfield Consolidated, below the 800-ft. level, is also in latite or along a dike of dacite that cuts through the latite. The Clermont ore, on the 1000-ft. level, carries free gold, is low in copper, and as amenable to cyanidation as any of the ore on the upper levels. Most of the gold appears in the same finely divided, rusty, free state that characterizes the ore in the Goldfield camp.

One of the orebodies on the 1000-ft. level is 20 ft. wide, as developed by a crosscut, and averages approximately $100 per ton, while another orebody about 50 ft. to the north on the strike is about 4 ft. wide and also averages about $100 per ton. These are known as the south orebodies. The one north of the shaft is lower in grade, averaging about $20 per ton for a width of 8 ft. All these finds are of great importance, for they show that as rich ore occurs on the 1000-ft. level as on the upper levels. There is much rich ore on the 750-ft. level and in one of the stopes there is a body of ore which furnished, at the time that the mill was damaged by the fire, 600 tons of ore averaging $800 per ton.

Origin of the Ore

The importance of this rich ore at depth will be more fully seen when the manner of the formation of the ore, as given by F. L. Ransome,[1] is briefly explained.

According to Mr. Ransome, the ore was probably formed by precipitation, from a sulphide solution, of native gold and a less amount of a gold telluride of uncertain composition, called goldfieldite. This precipitating was done by descending solutions containing much sulphurous and sulphuric acid formed by the oxidation of the hydrogen sulphide in the solutions that carried the gold up from the magma below. This sulphuric acid attacked the silicate minerals and formed an aluminous sulphate mineral called alunite.

There were at least two stages in the ore-forming action. First there was a minor mineralization which consisted mainly of the silicification of certain areas in the fractured zone. These later formed brittle, resisting patches in the plastic alunitized and kaolinized dacite, latite and andesite. When the zone of previous fracturing was subjected to stress again these resistant stocks of silicified rock refused to yield and flow along with the softer mass surrounding them. They were fractured, thus forming passageways for the ascending gold solutions and descending acid waters. Upon mingling with the surface waters, the gold precipitated mainly as native gold and less abundantly as a telluride. There are also other forms in which the gold occurs. The sulphide minerals and the silicious ore are precipitated in concretionary form. As a result the richest ore looks somewhat like plum pudding.

The sulphuric acid attacked the feldspars of the original rock and changed them into sulphates so that there is an abundance of alunite in the ore. This makes it sticky and hard to handle in the chutes when wet. The acid solutions from the altered feldspars in the shattered zone seemed to filter down through the softer portions and were not so confined to the more open parts of the zone as were the ascending solutions which appeared to have come up under considerable pressure.

Irregular Orebodies

In this way the localization of the ore into irregular shoots is accounted for. These shoots are quite irregular near the surface, but deeper down there is a tendency for them to become more regular. One reason that the oreshoots are so much more irregular in the upper workings is that they were formed, according to Mr. Ransome, within from 300 to 1000 ft. of surface. There is a feathering out and breaking-up of the fissure which characterizes the upper part where the diminution of the pressure on the rocks has allowed the fissures to be more wandering in character. Moreover, there probably has been some rearrangement of the ore minerals in the upper parts of the shoots as erosion progressed downward, but the orebodies as a whole show little if any signs of secondary concentration of the gold.

Another thing that had an influence in rendering the localization of the oreshoots more pronounced, with depth, is the fact that the alunitization of the rock rendered it less permeable. Below a certain depth the ore-bearing solutions had to ascend through the more open channels formed in the brittle rocks that were left in the fractured zone. The descending surface waters, also, were forced to seek these less clogged channels for their downward journey. The joining of the lines of shattering in depth, as is characteristic of all fracturing, would tend to limit the number of these channels along which the solutions ascended.

The finding of rich ore at a depth of 1000 ft. in the Clermont shaft workings shows that the solutions penetrated to that depth, and that the conditions were just as conducive at that depth to the formation of rich ore as above. The fact that the alunite is as abundant on the 1000-ft. level as above, provided Mr. Ransome's hypotheses in regard to the ore genesis are correct, also shows that the sulphuric acid solutions from the surface had not as yet met with any great resistance to their travel downward through the fractured rocks. Moreover, the fact that apparently as much of the gold is in the free form as on the upper levels shows that the descending solutions were still rich in precipitant at that depth.

Good Ore Expected at Still Greater Depth

There seems little reason for thinking that the limit, in depth, of the precipitating condition is being approached. There is no reason to suppose that the rich ore at Goldfield will not persist to as great depths as the Comstock, or that mining will not extend as deep as at Grass Valley. The main consideration seems to be, how the depth is going to affect the quantity rather than the grade of the ore.

Owing to the fact that the nature of the wall rock does not seem to have had any effect on the genesis of the ore, there does not appear to be any reason for assigning so much importance to the wall rock as has been done in the past. There seems to be no reason for thinking that the latite or alaskite, and especially the indurated carbonaceous shale which underlies the latite, should not form the sides of an open channel for the solutions to circulate as did the andesite and the dacite nearer the surface. The ore is due to the meeting and commingling of the descending and ascending solutions, more than to the chemical composition or physical condition of the wall rock or of the rock breccia filling the channels through which the solutions traveled.

The feature at Goldfied is the extraordinary richness of the ore. For instance, during 1909 the Consolidated company shipped to the smeltery 1500 tons of ore that averaged 35 oz. per ton, while the mill heads average close to $35 per ton. Of course, 2-oz. gold ore is more erratic than low-grade ore, and its mining is more hazardous. There is no reason to think that the end of the Goldfield Consolidated or of the Florence-

[1] *Prof. Paper* No. 66, of the U. S. Geol. Surv.

Goldfield ore is anywhere in sight. Moreover, the dividend of 25 per cent. on a market price of $8 for Goldfield Consolidated stock is assured for over a year and a half by the ore developed in the present shoots without depending on probable ore.

Goldfield Consolidated's Ore Becoming Lower Grade

During the last few months the heads at the Consolidated mill have been falling steadily. It seems probable that unless high-grade ore is found in greater proportions to the medium-grade ore, the Goldfield Consolidated will have to be satisfied with heads averaging nearer $30 per ton than $40 in order to mine the medium-grade and the high-grade ore in the proper proportions. The company, during last year, paid $2 per share in dividends and spent about $400,000 for repairs and equipment. The reserve fund at the beginning of the fiscal year, $1,365,000, is now $1,549,000, not counting the ore in process. During the fiscal year the gross output was $10,850,000 and the net profits approximately $7,400,000.

The Florence-Goldfield Company

The Florence-Goldfield company is the other large company at Goldfield, but it does not approach the Goldfield Consolidated in the amount of its holdings and capitalization. It has only 1,050,000 shares (par value $1 each) outstanding. About 65 per cent. of the shares in this company are still owned by the two men who owned the property in the beginning, Thomas Lockhart and A. D. Parker. It speaks well for the two principal mines at Goldfield to find that the men who have been interested in them from the beginning are interested in them.

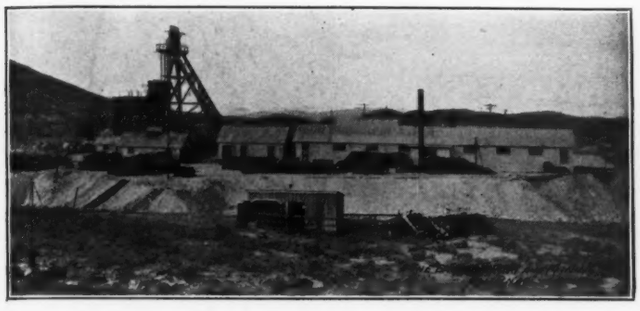
The leases on the Florence property have rivaled the Mohawk leases in the amount and richness of the ore produced. It was the ore from the Florence leases that gave Goldfield its early reputation. The reported production of these leases was about $5,000,000. The actual production was probably 50 per cent. more, as much ore was stolen from the leases.

These lease workings have shown a well pronounced ore zone in the Florence that has been productive throughout a north and south distance, along its strike, of about 2200 ft. Only about 600 ft. of this length, where it has been broken by faulting, has proved barren. The ore occurs in shoots along the distance named and is not continuous. Near the Florence main shaft, a distance of fully 900 ft. has been stoped almost continuously.

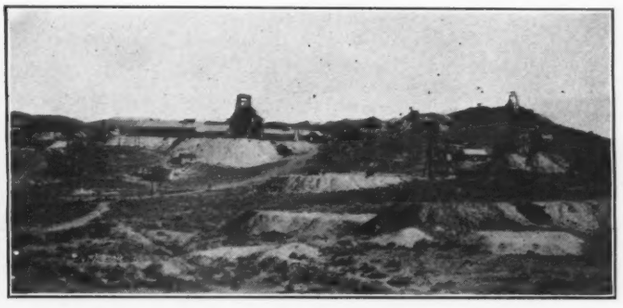
Orebodies on the Florence

The Florence has not been paying regular dividends because the company has been cleaning up the old lease stopes that lie mainly above the 350-ft. level, although on the Engineers' lease the ore was worked to a depth of 500 ft. This ore lies in a block of ground faulted out of the main line of ore deposition, and when the statement in regard to the 900 ft. of almost continuous stoping is made it includes the workings in the Engineers' lease fault block. The ore left behind by the leasers, after they had mined out the streaks of high-grade ore, has averaged, to date, about $20 per ton but during 1910 the heads fell to $12.

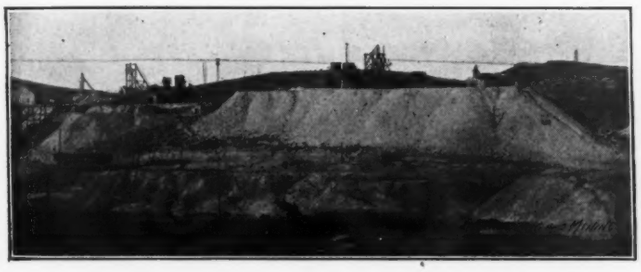
The orebodies in the Florence seem to be more defined in their occurrence than is the case at the Goldfield Consolidated, and they stand much nearer vertically. In fact, only in the bottom of



Clermont Shaft of Goldfield Consolidated



The Florence Mine, Goldfield, Nev.



The Combination Fraction, Goldfield

Red Top at Left. Laguna at Right

Goldfield Consolidated Mill

Mohawk Mine of Goldfield Consolidated

the oreshoots, as at present developed, does the ore show any tendency to lean in one direction more than the other, this tendency being to dip steeply to the east.

There is not a great amount of ore actually developed in the Florence property. During 1910 a body of ore, at right angles to the main occurrence and leading almost to the old Baby Florence lease workings, was found by the development work done under the guidance of Willis Lawrence, the manager. This orebody is nearly vertical and about 6 ft. wide. The ore is of milling grade and averages about $12 per ton. Also in the Baby Florence workings, a body of ore about 8 ft. wide was found within about 4 ft. of one of the drifts that the leasers had driven almost parallel to it. They did not find this ore owing to the limited time that the lease had to run. The leasers considered that driving was more promising than crosscutting at that point. Throughout the Baby Florence workings, many bunches of high-grade ore have been found by the leasers, giving the lease a gross reported production of $100,000. What this new find will develop into is hard to say. At present the small amount of development work done on it has only shown ore of milling grade.

No Deep Work at the Florence

North of the main shaft the mine has been worked only to the 350-ft. level. Most of the ore above that level has been taken out by the leasers. But in the sill floor of the 350-ft. level there are several places where the ore shows up well. The ore mined from the old lease stopes has averaged close to $20 per ton after the high-grade streak in the center of the stopes was taken out by the leasers.

In places the ore has widened out to 50 ft. In the stopes the ore has averaged 8 ft. wide and it is in this part of the mine that the 900 ft. of fairly continuous stoping has been done. With 20c. in dividends paid on $12 ore this makes the virgin ground in north end of the Florence below the 350-ft. level look well.

In the south end of the Florence the ore has been pretty well worked out to a depth of 500 ft. At several points on that level good ore is found in the floor, and in winze in the Little Florence ground a body of ore 20 ft. wide has been cut at a depth of 70 ft. below the 500-ft. level that averages $100 per ton across this distance.

The development of the orebodies at depth is now being resumed. The station on the 500-ft. level has been completed and the cutting of the skip pockets on that level will soon be completed. There is not much crosscutting to be done on the 500-ft. level to reach the zone of mineralization, so that the company expects to be mining from stopes on the 500-ft. level early in 1911.

Sinking to Be Continued at Florence

As soon as the crosscut is far enough away from the station so as not to interfere with the sinking, the shaft work will be resumed with the intention of sinking to a depth of 1000 or 1200 ft. This is forced upon the company, for the upper stopes are about cleaned up, although there is still enough ore to keep the mill running while the deeper development work is being done. There are 15,000 tons of broken ore in one of the stopes, as well as ore still in the walls of some of the lease stopes, and in the newer finds which have already been mentioned.

If the absence of ore at the Florence mine on the bottom levels was due to the fact that development work had failed to show new ore, I would hesitate in thinking well of the chances of the mine at depth. But there seems to be no question that the main reason for the absence of ore is the absence of development work. Since the present manager has taken hold of the property, the shaft has been raised from the 500-ft. level to the 350-ft. level, and the upper part from the 350-ft. level to the collar enlarged to a standard three-compartment shaft. While this was being done, the development, already referred to, was also carried on in the upper levels. Expenses have been cut and the mill put on an efficient basis in spite of its original design. All this has taken time.

The heads from the mill assay only $12, but owing to the fact that the ore can be mined without the use of much timber and with almost complete gravity handling, the management has been able to bring the costs down to $8.22 per ton covering all expenses. These costs are even lower than those of the Goldfield Consolidated, but there are widely differing conditions at the two properties.

Combination Fraction

The Combination Fraction is the only other property at Goldfield that is producing. This is a small patch of ground in the center of the most productive area, but unfortunately for the company it owns only about nine acres. The company is working about 35 men at its mine and mill and is treating about 50 tons of ore per day at the Goldfield Nevada Reduction Works, which it has leased. There are 15 stamps, and the mill is making a high recovery on the ore. The heads vary between $20 and $30 per ton. The mine is opened to a depth of 750 ft., but most of the ore is coming from the 300- and 400-ft. levels, although some is being mined on the 500-ft. level.

Jumbo Extension

The Jumbo Extension company is, indirectly, producing some ore, as the Consolidated is working on a half-and-half basis the ore that the two own together in a small area of ground, title to which the two companies wisely settled by compromise some time ago. But the amount of ore in this ground is not nearly so large as some of the Jumbo Extension engineers would like to have the public think.

The development of the Sandstorm area at depth may reveal good ore. There are also possibilities of finding good ore to one side of the present orebodies in the altered area, while no one can tell what may happen where the veins are in the underlying carbonaceous shale.

Promising Outlook for Goldfield

Goldfield is promising better times in the future. The district deserves much more prospecting than has been done away from the immediate vicinity of the Jumbo, Mohawk, Combination and Florence shafts.

For many kindnesses shown me while at Goldfield, I wish to thank J. R. Finlay, general manager, Prof. H. L. Smyth, consulting geologist, and Joseph Donnelly, mine superintendent, respectively, of the Goldfield Consolidated Mines Company, and also Willis Lawrence, general manager of the Florence Goldfield Mining Company, to whom I owe much of the information that is included in this article.

California Borax in 1910

By Lewis H. Eddy*

The production of borax ores in the year 1910 in California will total more than 37,000 tons. Between 25,000 and 30,000 of the tonnage was produced in Inyo county by the Pacific Coast Borax Company, and about 12,000 tons in the Lang district, near Los Angeles, by the Sterling Borax Company. There was no material increase in the Inyo county production over 1909. In the Lang district there was an increase of 4000 tons over the production of 1909. There were no new developments in either of these districts. In Ventura county new borax mines were developed by the Russell Borax Mining Company, but this company did not produce any borax for the market during the year. The output of refined borax products in California, and sold on the Pacific coast, amounted to about 1200 tons. The remainder of the ore was shipped to points in the east and Europe. The borax mined is so nearly pure that there is not a great difference between the tonnage of the raw ore and the refined product. The price ranged from 2½ to 3½c. per lb. on the Pacific coast.

*6 Ferry building, San Francisco, Cal.

Tennessee Phosphate in 1910

By John Ruhm, Jr.*

There was greater utilization of low-grade phosphatic material, following experiments by the U. S. Geological survey. Small interests consolidated.

*Mt. Pleasant, Tenn.

After two years of depression—starting with the financial troubles of 1907 and augmented by disagreements between the phosphate mining and fertilizer interests—the phosphate-rock industry in Tennessee (more particularly in Maury county) showed considerable activity during 1910; many operations were resumed and new ideas and methods developed. A number of changes in ownership were consummated—some of them being the results of negotiations begun in 1909; new plants were erected and old ones remodeled; methods were introduced and developed for saving material formerly left unmined or thrown back in the spoil banks; and a ready market was established for the tailings which were formerly dumped into the creeks or used for filling.

Tendency Is toward More Centralized Control

The tendency of 1910 was toward eliminating the small miner and putting the majority of the holdings into the hands of a few moneyed concerns, which of course carried with it preparations for mining and handling on more extensive and improved plans. During the year the International Agricultural Corporation, a company organized in 1909, through the efforts of T. C. Meadows and associates, and financed by the Morgan interests, purchased or otherwise acquired a large share of the brown-rock phosphate holdings in Maury and Giles counties, and some of the blue rock in Lewis and Hickman counties. They also took over several Tennessee fertilizer factories and entered into profit-sharing contracts with others. Among the phosphate-rock properties absorbed by the International Agricultural Corporation during 1910 were those of the Blue Grass Phosphate, Middle Tennessee Phosphate, T. C. Meadows & Co., Richland Phosphate, Jackson Phosphate, Maury Phosphate, Sterling Phosphate, Mt. Pleasant Bone Phosphate, France & Co., Little Bigby Phosphate, and Ruhm & Gregory—consisting of holdings in the Mt. Pleasant and Southport districts in Maury county; also the American Phosphate Company and the properties controlled by T. C. Meadows and S. S. Lord and others in Giles county; and the holdings of the Tennessee Valley Fertilizer Company in Maury, Williamson, Lewis and Hickman counties. They also purchased the capital stock, or at least a controlling interest, of the Independent Phosphate Company, a corporation made up of a number of independent fertilizer concerns and owning extensive phosphate holdings in Maury county. In addition negotiations were being carried on by them at the end of the year for the Brown Rock Phosphate Company, in the Southport district of Maury, and certain undeveloped holdings in Giles county.

The Charleston Mining and Manufacturing Company (which is the mining corporation operated by the Virginia-Carolina Chemical Company) purchased two large tracts near Wales station in Giles county, and began prospect work with the view of acquiring more in the same territory. The Armour Fertilizer Works acquired the phosphate interests of the Tennessee Chemical Company, which consisted of lands in Maury, Davidson and Hickman counties. Hoover & Mason, of Chicago, Ill., who owned the control and had contracts for mining the properties of the Standard Phosphate and Chemical Company in Maury and Hickman counties, purchased on their own account the Carothers and Prince lands in Hickman county, the Linck and Hackney places and the mining rights on the Orr and Carpenter properties in Maury county.

At the close of 1910 the concerns actively engaged in mining and shipping Tennessee phosphate rock were the International Agricultural Corporation, Charleston Mining and Manufacturing Company, Federal Chemical, Central Phosphate, Independent Phosphate, Globe Phosphate, Ruhm Phosphate Mining, Wiliams Phosphate, H. F. Alexander & Co. and W. V. Wilson, in Maury county; Armour Fertilizer Works, Volunteer State Phosphate Company and Meridian Phosphate Company in Hickman county; International Agricultural Corporation and American Agricultural Chemical Company in Giles County; and Charleston Mining and Manufacturing Company in Lewis county.

Old Dump Heaps Found Valuable

From experiments inaugurated during former years it was ascertained that the spoil banks thrown back in mining under the old methods, and phosphate sand and muck deposits heretofore not considered of sufficient value to handle contained much high-grade material that could be saved by proper methods of washing. In fact, the opinion has been advanced by those who claim to know that in the mined-out portions as much valuable material remains as was taken out. With the view of handling this material additions were made to the plants of the International Agricultural Corporation, the Charleston Mining and Manufacturing Company and the Federal Chemical Company. A new plant for handling their Giles county properties was started by the Charleston Mining and Manufacturing Company near Wales Station.

Hoover & Mason, who are making their first venture in mining and handling phosphate rock and phosphatic materials, but who have had a large experience in the mining and washing of iron ores in other sections of the country, erected on the property known as the Griffith place, near Mt. Pleasant, a plant complete in every particular and much more elaborate and of finer construction than anything ever attempted by others in this line in the State of Tennessee. This plant, which was practically completed and ready for operation at the end of the year, shows the result of careful study and experiment and gives promise of great improvement in the economy of handling and quality of output.

For many years a number of the agricultural experiment stations in the northern and eastern States have been making practical experiments in applying to the soil for purposes of fertilization finely ground phosphate rock in its crude state without any treatment; and the results obtained by them have—almost without exception—been satisfactory.

Possibilities of Crude Phosphate Rock as a Fertilizer

In the preparation by the methods in vogue of the lump rock, which was being shipped to the fertilizer factories, a considerable amount of tailings accumulated which contained from 8 to 13 per cent. phosphorus (40 to 65 per cent. B. P. L.), and which were being thrown away. The agricultural experiment stations, by actual trial, demonstrated that this material, if finely ground, spread with manures, or over fields growing clover, cowpeas and other legumes, would be gradually acted on by the decaying organic matter, or humus, and furnish a more economical and permanent supply of phosphorus for plant life than the preparations being offered by the fertilizer manufacturer. These ideas have been steadily and strenuously combated by the fertilizer interests but the use has rapidly increased, and during 1910 the trade in this line was large.

As a result of this increase the Ruhm Phosphate Mining Company, Central Phosphate Company and Mt. Pleasant

Fertilizer Company—all of Mt. Pleasant—which had previously embarked in the business, made extensive additions in their grinding plants and methods of handling the material; and new plants for this purpose were installed by the Williams Phosphate Company, at Mt. Pleasant, and Jackson & Cooper, at Spring Hill. At the close of the year others were making plans for similar installations. The Middle Tennessee Railroad was put into operation as far as Leatherwood and the grading from that point to Mt. Pleasant sufficiently done to warrant that by the summer of 1911 Mt. Pleasant will have another road, independent of the Louisville & Nashville, to handle its product. Shipments for 1910 probably reached 500,000 tons, or more; but the exact amount is not yet ascertainable. Prices f.o.b. Mt. Pleasant during 1910 were: $3.50@4 for 72 per cent. lump rock; $4.50@5 for 75 per cent. lump; and $3.50 for ground rock containing 12 per cent. phosphorus, lump rock being priced on the long ton and ground rock on the short ton.

Copper in California in 1910

By Lewis H. Eddy*

The output of California for the year 1910 is not likely to exceed 50,000,000 lb. of fine copper. This is a decrease of more than 15,000,000 lb. from the output of 1909. The decrease in production is not the result of failure to find the ore nor neglect of the development of mining, but due almost entirely to the shutting down of smelteries consequent upon the demands of the Farmers' Protective Association of Shasta county, alleging damage done to their crops by the sulphur fumes arising from the process of smelting.

The Bully Hill copper mine, situated just north of Pit river and east of the Sacramento, closed down about the middle of the year, responding to an order of the court in a suit brought to enjoin the Bully Hill Copper Mining and Smelting Company from damaging the crops of the farmers. Since that time this company has shipped some ore to the Balaklala, probably an average of 100 tons per day.

The Balaklala mine, on the west side of the Sacramento river, closed down its smeltery about two or three months ago for the same reason that the Bully Hill did, the sulphur fumes being complained of by the farmers. The Balaklala had been operating three blast and one reverberatory furnace during about three-fourths of the year, handling from 750 to 1000 tons of ore per day. Toward the end of 1910 operations were resumed on a small scale, experiments being made with the Cottrell process of smoke neutralization.

*6 Ferry building, San Francisco, Cal.

Mountain and Mammoth

The Mountain Copper Company slightly increased its production in 1910 over 1909, but this increase has no material effect upon the general output, for the reason that the Mountain Copper Company's operations are no longer a great factor in the copper production of the State, the operations of this company since the old orebodies have been worked out being confiend to products other than copper.

The Mammoth mine on Little Backbone creek, west of the Sacramento river, is the biggest producer and the mainstay of the Shasta county copper belt. But the production of this company was reduced for the same reason that affected the others, and although a baghouse was constructed at a cost of $252,000, it was unable until the cold weather set in to take the smoke of more than two furnaces out of the four.

Other Mines

In Calaveras county there was a small production in the year 1910, which may equal the production of about 5,500,000 lb. for 1909. One blast furnace and one reverberatory furnace, with a total burden of 100 tons per day, were in operation part of the year. At Campo Seco the old Union Copper Company was reorganized as the Calaveras Copper Company, and is owned by Boston capitalists. It is doing active prospecting work, but not treating any ores. In Del Norte county there is practically nothing doing.

A controlling interest in the mines and smeltery at Needles, southern California, was purchased by the United States Smelting, Refining and Mining Company, which owns the Mammoth mine, and new development work is reported to be in progress.

The Peyton Chemical Company, the local representative of the General Chemical Company, shut down its reverberatory furnace in the latter part of 1910. During most of the year this company operated one or two reverberatory furnaces, dependent upon the requirements, and smelted a minimum of 2000 to 4000 tons per month.

The Smoke Problem

The situation in Shasta county in 1910, while disastrous to the copper industry, attracted serious thought to the problem of controlling sulphur fumes, and to the comparative value of the copper industry and the farming industry. The damage done to the verdure and vegetation of Shasta county by the sulphur fumes from the smelteries is small compared to the value of the copper-mining industry in that county. These smelteries are situated some distance from the active horticultural and agricultural localities. The smelteries of the Balaklala and the Mammoth, and the Mountain Copper Company's old smeltery, are on the west bank of the Sacramento river, where there is a small acreage devoted to farming, within a radius of 10 to 15 miles. The Bully Hill smeltery, situated about 10 miles east of the Sacramento and north of the Pit river, is not within several miles of even the smallest of the ranches. All these properties are situated a distance of about 10 to 25 miles north of Redding. The horticultural region of Shasta county lies several miles south of Redding.

Iron Production in Germany

The production of pig iron in the German Empire for 11 months ended Nov. 30, as reported by the German Iron and Steel Union, was as follows, in metric tons:

	1909.	1910.	Changes.
Foundry iron	2,260,743	2,677,987	I. 417,244
Forge iron.....	600,394	593,463	D. 6,958
Steel pig.....	1,002,075	1,245,160	I. 243,085
Bessemer pig.....	374,085	440,441	I. 66,356
Thomas(basic)pig	7,516,866	8,529,217	I. 1,012,351
Total.....	11,754,163	13,486,241	I. 1,732,078

The total increase for the 11 months was 14.7 per cent. Steel pig includes spiegeleisen, ferromanganese, ferrosilicon and all similar alloys. Estimating December output, the total production of pig iron in Germany in 1910 was 14,775,000 tons, an increase of 1,857,000 tons, or 14.4 per cent. No monthly reports are made of steel production; but estimating on the pig-iron basis, the make of steel of all kinds in the German Empire was approximately 13,890,000 metric tons, a gain of 1,840,000 tons over 1909. Both pig-iron and steel production reached the highest points ever reported.

The foreign trade reports are complete only for 10 months ended Oct. 31. For that period the official figures are, in metric tons:

	Exports.	Imports.	Excess.
Iron and steel....	4,001,560	460,342	Ex. 3,541,218
Machinery.....	320,546	60,114	Ex. 260,432
Total.....	4,322,106	520,456	Ex. 3,801,650
Total, 1909.....	3,488,098	436,001	Ex. 3,052,097
Iron ores.....	2,476,597	8,215,259	Im. 5,738,662
Manganese ores..	2,679	447,779	Im. 445,100

The increase in exports in 1910 was 834,008 tons, or 23.9 per cent.; in imports, 84,452 tons, or 19.4 per cent. The foreign trade of Germany was actively pushed during the year. The iron-ore imports were chiefly from Sweden, Spain and Russia; the exports were principally of ores from Luxemburg and Lorraine to Belgium and France. Most of the manganese ore imports were from Russia, where the trade in those ores is now almost wholly controlled by German interests.

The exports of aluminum from France during the first 10 months of 1910 were 3512 tons, against 3432 tons for the same period of 1909.

The Tonopah District in 1910

By Herbert Haas *

Production increased in 1910 and a notable incident of the year was the finding of an important orebody in the Tonopah-Belmont. Indications that rhyolite-dacite is extrusive.

*Superintendent, MacNamara Mining Company, Tonopah, Nev.

The production of precious metals in the Tonopah district, Nevada, for 1910 shows a great increase as compared with the output of 1909. The amount of gold produced was 105,538 oz., and the silver production was 9,954,455 oz., an increase of 42.18 per cent. in gold and 47.78 per cent. in silver over the 1909 production. The Tonopah-Belmont Development Company contributed 75.28 per cent. of the gold increase and 74.60 per cent. of the silver increase, and the Tonopah Extension Mining Company 20.93 and 18.80 per cent., respectively. The balance of the increase was contributed by the various companies, as noted in the tabulated statement of production.

The increased production of the Tonopah-Belmont was due to the discovery of a bonanza orebody on the 1100-ft. level, in the latter part of December, 1909, which has since been developed systematically. Its gross production for the year was $2,448,279 and net, $1,294,750. This discovery illustrates the changing fortunes of mining enterprises. A little over a year ago this company was practically out of ore, and its stock was a drug in the market, being offered for 60c. per share. Today its shares are quoted at $4.50, which gives the property a market valuation of $6,750,000.

The Tonopah Extension did not participate in the production of 1909, confining its operations to the erection of its milling and cyanide plant, and the development of ore reserves. This mill started in the latter part of January, 1910, and was in perfect running order by April, the production for the year covering 9 months' operation only.

Figuring gold at $20 per ounce, and the average price of silver for 1910 at 53.5c. per ounce, Tonopah produced $7,436,393, an increase of $2,548,488 over 1909. The increase in the price of silver in 1910 over that in 1909 contributed $298,633 of the above $7,436,393. The total ore production for 1910 was 356,000 tons, and there was driven a total of 58,000 ft. of drifts, crosscuts, raises, winzes and shafts.

Tonopah Mining Company Dividends Amount to 685 per Cent.

This company is well in the lead in point of production, and is in exceptionally good financial condition. Its net earnings are $1,500,000 annually, of which $1,400,000 are disbursed in dividends. This is a return on the original capitalization of 140 per cent. annually (one million shares of $1 par value having been issued), and 17½ per cent. on the present market price of the stock. In addition to this, the company commands a surplus of $5,000,000 and ore reserves that will supply the mill for three years, valued at $9,000,000. Including the last quarterly dividend of 40 per cent., payable Jan. 21, 1911, this company has disbursed to date a total of $6,850,000 or 685 per cent. on the original capitalization.

Work in this mine was confined to systematic mining and development, and nothing important in the way of new developments took place during the year. Approximately 170,000 tons of mill ore were mined, and 21,000 ft. of development work completed. The sinking of the Sand Grass shaft was discontinued, when it became apparent that a south-dipping fault had displaced the vein into the Tonopah-Extension ground. Two diamond drills are working on the Sand Grass claim. The drill holes are 1000 ft. deep.

An important addition to the surface plant was the erection of accumulators and generator set, which will relieve the main power circuit of the large fluctuations to which it was subjected on account of the variable-load requirements, principally occasioned by the high peak-loads of the hoists. On account of the frequent violent electric storms, the power service is often interrupted, seriously interfering with the mill operations, the slimes settling and tailings wheels becoming submerged if the current is shut off without warning. The new storage-battery plant can supply current for 10 hours, keeping in operation that portion of the machinery the continuous operation of which is essential and should be insured.

Such an accumulator system is installed by the Goldfield Consolidated Mines Company, of Goldfield, Nev. Its effect on the power line, water wheels and generators has been beneficial, as it relieves the system of frequent peaks, and the water wheels of excessive stress due to overloads, the power factor becoming more constant. Despite the high installation expenses, which are given at $200,000 for the erected plant, and the high cost of operation, the conveniences and saving derived from such a plant far outweigh the outlay.

Properties Adjoining Tonopah-Belmont

The development for 700 ft. on the strike of the Tonopah-Belmont's new orebody, on the 1100-, 1000- and 900-ft. levels, and by winzes 66 and 122 ft. deep, to a present depth of 1288 ft., provided large ore reserves and placed this company in an excellent financial condition. Developments in this mine furnished the incentive for a number of companies owning claims adjoining the property of the Tonopah-Belmont to resume operations, among which are the Jim Butler, the Rescue-Eula and the Belmont Extension.

The Jim Butler, which is controlled by the same people who are prominent in the affairs of the Belmont, resumed operations late in November. This company owns the largest acreage of any company in the district, which, beyond a small amount of work, has never been prospected outside of that portion contiguous to the Tonopah Mining company's holdings, and a small portion known as Gold hill. At present, one lease holder is working on the ground and is shipping a small amount of ore weekly.

The Rescue-Eula Mining Company is a reorganization of the old Rescue and Eula companies, and owns claims south of and adjoining the Belmont. The Belmont Extension owns claims southeast of the Belmont, and south of the Halifax property.

The Mizpah Extension, owning property north and northeast of the Belmont, has a shaft down nearly 1000 ft. on its Sparrow claim, and only a few feet northeast of the Favorite claim of the Belmont. A southeast crosscut, started from the 980-ft. level, is at present in rhyolite and is being continued with the object of reaching the earlier andesite, known as the "lode-porphyry."

Montana-Tonopah Mining Company

Work that eventually may be of great importance as bearing on the future of the ground northwest of the Montana-Tonopah is the exploration of the Jack Rabbitt, Mining Chance, Cronje Fraction and Sampson, by a drift, and a crosscut to the northwest through the Cronje to the Little Tonopah. As step faults with displacements of considerable magnitude are common in the district and the dip of these faults is usually to the north, this prospect drift was sent out to cut one of these faulted vein segments. The fact that the drift has been in later andesite for some time was sufficient encouragement to cause the Montana-Tonopah to acquire the Eagen-Oddie group of claims, adjoining the property on the north.

Important Geologic Conclusions Resulting from Tonopah Extension Work

The most important development in this property was the finding of an orebody on the 400-ft. level, which at the point of discovery extended up to the contact of the earlier andesite with the cap rock, or later andesite, at which contact the quartz veins of the district come to an abrupt end. This vein is being further developed by long crosscuts from the 500- and 600-ft. levels.

Another discovery in this mine, not only of importance economically, but one throwing much light on the geology of the district, was the finding of an economic vein in the rhyolite-dacite under conditions which leave no doubt that this rock formation was poured out as a flow, and is not an intrusive in the overlying earlier andesite, the conclusions first reached by Mr. Spurr. Further, that the veins are later than the rhyolite-dacite. This question has long been an open one, some geologists and engineers siding with Mr. Spurr, others taking the view that the various formations are successive lava flows.

Revival on the Comstock

Special Correspondence

The year 1910 upon the Comstock lode was devoted to active development work in the deep levels of the several mines, and this work was carried on by means of the United Comstock Pumping Association which was formed by all of the important mines upon the lode for the purpose of coöperation in development. Included in the association are the Ophir, Con Virginia, Mexican, Sierra Nevada, Union Consolidated, Best & Belcher, Gould & Curry, Savage, Hale & Norcross, Chollar, Potosi, Exchequer, Bullion, Yellow Jacket, Crown Point and Belcher mines.

At the Con Virginia, the main working shaft, known as the C. & C., was sunk to the 2650-ft. level and the large pumping plant consisting of the Risdon hydraulic elevator and Riedler electric pumps were augmented by the addition of a Starret pump, and the combined plant is believed to be sufficient to handle any water that may be encountered to the 3000-ft. level. At the Ward shaft the new Scranton pumps, purchased at a cost of $45,000, are being installed and in a few weeks the shaft, which is now down 2575 ft., will resume sinking.

The Gold Hill mines, consisting of the Yellow Jacket, Crown Point and Belcher, will be drained at depth through this shaft a distance of 800 additional feet.

New Orebodies Developed in the Ophir and Mexican Mines

The Ophir mine uncovered important orebodies on the 2300- and 2400-ft. levels and a three-compartment working winze is now down to the 2450-ft. level and being rapidly driven to reach the orebody at 2500 ft. The output from the Ophir mine for one week of six working days in December was $15,700, and the average grade of the ore was $85 per ton. The Mexican mine was developed to the 2500-ft. level and during the year uncovered three promising orebodies from which ore was shipped to the plant of Charles Butters, Ltd., of London, which is located on the Comstock and which is connected with the mines by means of an aërial tramway. The Union and Sierra Nevada companies are sinking a joint winze to reach the new orebodies found to the east of former workings in the Ophir and Mexican mines, which are believed to extend in the Union and Sierra Nevada ground. Practically all of the ore was taken from new and unprospected ground, situated to the east of any former workings of the old days on the Comstock lode. The repairs and improvements in the Comstock tunnel were completed, electric locomotive, new track, new drain flume installed and some 2,000,000 ft. of new lumber used in reconstructing the timbering, so that the property was placed in first-class condition at a cost of approximately $467,000. Most of the annual meetings of the companies were held during the month of December and in each company it was found that the eastern interests, headed by Franklin Leonard, Jr., B. F. Shaw, Edward B. Sturges and the Comstock tunnel interests, were in control of the mines. At the annual meeting of the Ophir, Franklin Leonard, Jr., was re-elected president of the company. The superintendent's report showed ore production of $257,000.

Milling also Reviving

The mill erected at the mouth of the Comstock tunnel (old Sutro tunnel) has been engaged in handling ore from the Con Virginia mine. The Yellow Jacket mill treated ore from the Yellow Jacket, Crown Point and Belcher mines. The Butters plant reduced ore from the Mexican, Potosi and Chollar mines. The Kinkead mill handled the ore from the Ophir mine, except the high-grade, which was shipped direct to the Selby smeltery. Several other mills and reduction plants were on the lode. The largest new plant erected during the year was the Rocky Point mill, built on the Carson river, at Dayton, and intended to work the ore from the Hayward mine, with which it has been connected with an air tramway. This plant is said to be the most modern milling plant erected in Nevada during the year, and has a capacity of 40 stamps.

During the year the eastern interests which have been buying shares in the Comstock mines, announced their connection with these properties and carried out a policy of active development work in the deep levels. They nominated as their engineer Maj. George B. Burbank, who is now supervising all construction and development.

Good Developments on the Brunswick Lode

Prospecting upon the Brunswick lode parallel with the Comstock, was carried on from the Comstock tunnel level and a drift 1100 ft. long opened and equipped with track and electric lights and it is believed that ore from this section will attract attention soon. The Comstock Phœnix, about 50 ft. north of the north line of the Comstock tunnel ground on

GOLD AND SILVER PRODUCTION OF TONOPAH, NEV., IN 1910.

Company.	1909.		1910.		1910 Increase or Decrease.	
	Gold, Oz.	Silver, Oz.	Gold, Oz.	Silver, Oz.	Gold, Oz.	Silver, Oz.
Tonopah Mining	47,320	4,270,000	47,400	4,300,000	80	30,000 I.
Tonopah-Belmont	9,750	903,000	33,320	3,300,558	23,570	2,397,558 I.
Montana-Tonopah	8,064	745,080	9,589	943,550	1,525	198,470 I.
Tonopah Extension	(Did not operate 1909) (9 mo. 1910)		6,553	604,577	6,553	604,577 I.
McNamara	5,122	462,060	2,455	215,040	2,667	247,020 D.
West End Consolidated	2,340	216,237	4,588	447,850	2,248	231,613 I.
Tonopah Midway (estimated)	1,633	142,880	1,633	142,880	.....	.....
Total	74,229	6,739,257	105,538	9,954,455	31,309	3,215,198 net I.

This company acquired in 1910 a total of 175.5 acres, comprised in the properties of the McKane and Red Rock Consolidated claims, for which the final payment was made in June, 1910.

MacNamara Mining Company

Aside from the regular mining operations on the upper vein of the MacNamara, the lower contact vein between the rhyolite-dacite and the calcite-andesite was extensively developed from the 800-ft. level. The ore encountered in this vein is being stoped, and a station has been cut on the 700-ft. level, from which a drift will be started to reach the vein in the western territory of the property.

The production for 1910 decreased considerably, owing to the fact that shipments were limited to high-grade ore, sent to the smeltery, the lower- and medium-grade ores being reserved for future milling operations.

The Venezuelan government has granted a 30-year concession to Alfredo Sharfonorth, of Caracas, to exploit El Alimpo gold mines in the Sucre district, in the State of Miranda.

the Brunswick lode sank its shaft 500 ft. and found paying ore on each level, which was shipped to the Butters plant for treatment.

Other Activities Revived by Mining

The Virginia & Gold Hill Water Company which furnishes the water supply for the towns of Virginia City and Gold Hill, has expended about $100,000 upon its plant and greatly increased its supply by the purchase of additional water shed. The Washoe Club, famous in the old days as the leading mining club in the United States, reopened and again became the meeting place of mining men, as well as the center of festivities upon the Comstock.

No new companies were floated and no new stock offered for sale upon the Comstock lode during 1910, but the old companies have continued with their small capitalization, the largest of which is Con Virginia, with only 216,000 shares and the Ophir with 201,000, nearly all the other companies having only 100,000 shares each. The economies effected include the reduction of salaries and expenses to the extent of $55,000 per year below former above-ground expenditures, and the amount has been applied to development work underground. The total expenditures for the year are believed to exceed $1,000,000. During 1911 the policy of active development of the deep levels will be pursued and many mining men are agreed that the prospects of important orebodies being uncovered are bright.

Chromite in California

By Lewis H. Eddy*

The output of chrome-iron ore in California for 1910 was not appreciably greater than that of 1909. About 200 tons of the production came from Amador, Shasta and Tuolumne counties. Half the entire production of approximately 450 tons came from scattered points. There are numerous deposits of chrome ore in the State, and in some sections deposits are found of a character that would make the mining of the ore profitable but for the fact that they are situated away from transportation facilities. Much of the California ore that has been mined has not proved up to the requisite quality, but the fact is that the best ore is found in localities where transportation is lacking.

The total number of mines worked underground in the State of New York is 40. There are about 12 iron mines in operation, 13 of gypsum, eight of talc, two each of salt and pyrites, and three of graphite.

*6 Ferry building, San Francisco, Cal.

The Pyrites Industry in 1910

By John Tyssowski

From available data it appears that the production of pyrites in the United States in 1910 was less than in 1909. The 1909 total was 210,000 long tons, while the probabilities are that the 1910 production was not in excess of 200,000 tons. The decrease was due to the closing of several of the producing properties in New England and a curtailment at several of the other mines. To offset the restricted domestic production imports increased. The importations of sulphur ore carrying over 25 per cent. free sulphur for the 10 months ended October for three successive years were: 1908, 557,418 long tons; 1909, 585,319 tons; 1910, 658,151 tons. The reduction of ocean freight on Spanish ore from 13s. 7d., to 10s. 3d. toward the end of the year assisted the trade in foreign pyrites.

Prices

There was a gradual upward tendency of prices in the pyrites market in 1910. Quotations for domestic non-arsenical furnace size opened the year at 11½c. per unit of sulphur per long ton, closing in December at 11½@ 12c. and domestic fines advanced from 10@10½c. to 10¾@11c. Imported non-arsenical furnace also advanced from 12½ to 13c. during the year. Imported arsenical furnace exhibited a rise from 11½@12c. to 12½c., and arsenical fines from 9 to 9¾c. Imported non-arsenical fines advanced from 10½@11c. to 11@11½c. per unit. As a result of the decline in the domestic production, importers of Spanish pyrites were able to raise the price on their ores to keep pace with the rising price of the domestic product.

The increased prices for pyrites prevailed in spite of the large production of acid at Ducktown, Tenn. The last four chambers of the second unit of the Tennessee Copper Company's plant were completed and the unit put into commission in December. At the end of 1910 the capacity of the company's plant is 14,000 tons of 60 deg. B. sulphuric acid per month, and it is anticipated that this capacity will be slightly increased by the addition of two new Gay Lussac towers at an early date.

The pyrites market was also not affected in 1910 by the importation of Canadian pyrites as was anticipated. The Rib Lake property, in the Temagami forest reserve, was shut down in September when the orebody pinched, after having produced only about 4000 tons of 45 per cent. ore.

The Vermillion Lake property, which was expected to be a large producer in 1910 changed hands again and was still being developed throughout the year, and it is understood that no ore was shipped. The company controlling this property, formerly known as the Northern Pyrites Company and later as the Ontario Securities Company, is believed to have been taken over by the General Chemical Company. The present high freight rate to Ft. William makes its practically impossible for this ore to compete in the United States market.

The Various Properties

The Milan mine, at Milan, N. H., changed owners in the spring of 1910 and was only operated for about six months during the year. It is understood that the grade of ore did not prove astisfactory and as a result the mine was allowed to fill with water. The old Davis mine, at Davis, Mass., was finally worked out and allowed to cave. Since August a new mill has operated on stockpile material, producing about 40 tons of concentrates daily. Exploration from the No. 4 shaft has been advanced and a crosscut of 75 ft. is reported to have cut a promising orebody at a depth of 90 feet.

At the St. Lawrence Pyrites company's mines, in St. Lawrence county, N. Y., about 100,000 tons of crude ore were mined in 1910. The general average of this ore as mined was close to 22 per cent. sulphur, the ratio of concentration being about 3 into 1. New developments in No. 12 and No. 16, in the Anna mine, are reported, however, to have shown richer ore, bringing the average up to nearer 23 per cent. sulphur. About one-third of the production of this company came from the Stella mine and two-thirds from the Anna. The only change at the St. Lawrence company's mill was the addition of Harz jigs to retreat tailings. The milling equipment comprises two Hancock and three Harz jigs and 11 concentrating tables, including three Deister slimers. The capacity of the mill is 12 to 13,000 tons of mill rock per month. It is understood that an average price of 11½c. per unit was realized on ore from this property, delivered f.o.b. De Kalb Junction.

The Virginia mines again report an output of about 120,000 tons of pyrites. This is the largest figure for any State in the Union. The bulk of the production, as usual, came from the Cabin Branch mine, at Dumfries, Prince William county; the Arminius and Sulphur Mining and Railroad Company's properties at Mineral, Louisa county; and, from the General Chemical Company's property in Carroll county. No new producers of importance entered the field. The production of the Louisa county mines was mostly fines, and that of the General Chemical property pyrrhotite. It is reported that the property of the Sulphur Mining and Railroad Company, at Villa Rica, Ga., was operated in 1910 at about the usual capacity.

Mining in Guerrero in 1910

By William Niven*

During 1910, owing to the better recognition of the rich mineral resources of the State of Guerrero, many newcomers were attracted to the State, and several important operations undertaken. It is now apparent that gold is likely to be the most important of the mineral products of the State in the near future.

At the Campo Morado important operations were carried on during 1910, and this property continued first among the producers of the State. Two lead smelteries of 40 tons capacity each are at this property and the shipments of bullion and silver-gold ores aggregate a million pesos per year.

The Achotla mine, owned by the Suriana Mining and Smelting Company in the same district, also produced regularly during 1910 gold-silver-lead ore, treated in a 30-ton smeltery.

At Placeres del Oro the 10-stamp mill of the Garduño Mining Company, which has been in operation for nearly 18 years on high-grade ore, operated regularly during 1910. A 40-ton Lane mill is being installed which will increase the mill capacity and enable the company to treat the low-grade ore, of which there is reported to be a great quantity.

The Josephine mine in the Santo Tomas district, 15 km. southwest of Pezoopan, owned by A. H. Robertson and associates, was actively developed by two tunnels on the vein and an upper tunnel in which a streak of 30 cm. of 28-gram gold and 3-kg. silver ore was found.

The Nebraska & Maine Mining and Smelting Company completed its 160-ton smeltery on the Santa Lucia mine, near Balsas, and is now operating. Development was continued on the silver properties of the San Vicente Company, near Tlalcapa, and machinery for the treatment of the ore is being received. A new district near Mescala shipped to San Luis Potosi. The Alacran mine, silver and copper, on the north side of the Balsas river near Churumuco is being developed by C. C. Bancroft.

A British company bought the Bonanza Block in Los Pozos district, north of the Balsas river. This is a large gold quartz deposit reported to average 30 grams gold per ton. The English interests are represented by Sir William Wiseman, who visited the property in July.

The Mina Grande at San Nicholas del Oro, owned by the Balsas Valley Company, was developed by a new tunnel on the vein 800 ft. below the San Patricio and 2000 ft. below the upper workings where Mr. Cable, who controls the company, decided to install a 20-stamp mill with tube mills and cyanide annex, the cost to be $100,000.

On Jan. 1, 1911, work will be commenced on the H. W. Reed mines, the San Cayetano, Santa Maria, Descubridora, San Nicholas and Divina Providencia, also at San Nicolas. Two tunnels will be driven on the San Cayentano property, which has been a steady producer of gold for more than 20 years, producing upward of 20,000 pesos yearly under crude operations. Other tunnels will be commenced on the Santa Maris and the Descubridora to tap the old workings at lower levels. The company will also start work on the Divina Providencia. At Pericotepec, the Mina Vieja was under development by a Spanish company.

There was activity in the development of the timber and agricultural resources of the state, and several large projects are under way, backed by American and Canadian companies. A plan for the power and irrigation project on the Balsas river was floated in London and power will be distributed as far as Mexico City.

*Mining engineer, Gante 12, Mexico, D. F.

Taxco District, Guerrero

By Boris Gorow*

At the beginning of 1910 there were in the Taxco district few working companies: Atlixtac, which has been actively developed during four years; El Cedral and La Lajuela, under working bond to Boston capitalists; Aztecas Mineral Company; El Fraile lead smeltery and the Espiritu Santo. In June other companies entered the field, and since then the improvement was steady. Atlixtac is finishing its 70-ton cyanide plant. Espiritu Santo purchased and operated the Purisima concentrator. Moro y Milagro was purchased by a Mexico City company and unwatered. The Chorillo concentrating plant was purchased and kept running, and the Santa Ana smeltery was in commission part of the time.

La Santa Gertrudis zinc-lead plant was erected to treat the ores of the Providencia and Carmen mines. El Fraile smeltery began production after the rainy season. The Taxco Mines of Mexico, a London-Edinburgh concern, purchased of the Rosario properties and under the management of Dr. T. R. Marshall exposed large bodies of milling ore and the erection of 100-ton plant is justified. The Santa Gertrudis mines, long held by the Paquentin family, were sold to a Mexican company. The Cazadores mines, rich in lead-zinc, have over 1000 ft. of development and ore was developed to warrant reduction works. The Acatitlan mines suspended operations pending reorganization. The Pedregal mines are under option to a French syndicate.

In the Tetipac municipality a dozen mines and prospects were in development. The most important were: Bella Vista, San Miguel del Monte, El Rosario, Puerto Corral, Sorpresa y Anexas and Los Varones. At the latter, belonging to the Guerrero Mining and Milling Company, Colin Timmons, manager, 40,000 tons of milling ore was blocked and it is expected a cyanide plant will be erected. In general, the mining situation of the camp was satisfactory not only on account of the number of mining companies at work, but principally due to the fact that the old producing mines were in the hands of *bona fide* mining companies, backed by ample capital under the direction of competent men.

The construction of a wagon road to Naranjo, the nearest railroad station, the granting of a narrow-gage railroad concession to F. E. Olendorf, and the offer to the Toluca-Sultepec Electric Power Companies to extend the lines to Taxco were improvements of a general nature inaugurated during 1910.

*Mining engineer, Taxco, Guerrero, Mexico.

The Fertilizer Industry

Vice-president Shaw of the International Agricultural Corporation said recently: "Use of commercial fertilizer in the United States should double in the next eight years, and treble in the next 12, owing to intensive cultivation in districts now fertilized and to necessity for fertilizer in the middle West and Southwest, where its use is almost unknown.

"Europe in its highly cultivated districts obtains 30 to 35 bushels of wheat per acre, whereas our yield is 15 to 18, and is declining. Germany uses 1500 to 2000 lb. of fertilizer per acre; our average in States now using the most is only 200 to 300 pounds.

"Estimated consumption of commercial fertilizer during the last four years in New York, South Carolina, Alabama and Georgia, in tons, has been as follows:

	1910.	1909.	1908.	1907.
New York..	375,000	335,000	290,000	300,000
South Carolina.....	750,000	685,000	680,000	631,000
Alabama...	325,000	315,000	312,000	300,000
Georgia....1,050,000		829,000	812,000	785,000

"The International Agricultural Corporation is already operating in all States east of the Mississippi, and because of the geographical position of its phosphate rock and sulphuric acid supply in Tennessee, is particularly well situated to take advantage of the rapidly increasing consumption in the middle West. Florida 68 per cent. phosphate rock in the last five years has varied from $2.50 to $5.50 per ton and for 75 per cent. phosphate rock from $5 to $7.50 per ton, the low figures having been reached in 1909. The market in December, 1910, was about $3 for 68 per cent. rock and $5.50 for 75 per cent. rock.

"Deposits of phosphate rock are practically limited to Tennessee and Florida, except for deposits in Utah, Wyoming

and Idaho. The Government has withdrawn from entry a large part of deposits in the three Western States, but, in any case, freight rates from those points would be too great to allow of use in the middle West and South. The Government has also recntly withdrawn from entry about 37,000 acres of Florida phosphate lands."

Other fertilizer companies also reported good business in 1910. Thus the shipments of the Virginia-Carolina Chemical Company are said to have been nearly 10 per cent. larger than in the corresponding period of 1909, and its current fiscal year is expected to be the largest on record.

Barytes in 1910

The barytes industry for the year 1910 continued about the same as in previous years. The business is small, the total consumption of barytes not much exceeding 55,000 tons annually. Between 12,000 and 15,000 tons of crude material are imported each year, containing 95 to 96 per cent. $BaSO_4$. This is delivered at Atlantic ports for about $5.50 per ton with an additional duty of $1.50 per ton. The imports for 1910 were approximately the same as in 1909, when they were 12,422 tons. The increased tariff has not had any appreciable effect on the barytes industry. It has increased the cost of raw material a small amount but not enough to prevent the importation of the German product.

German Barytes a Strong Competitor

The German barytes is a strong competitor of the American product, inasmuch as it is almost free from impurities such as iron, which is found in nearly all of the barytes mined in the United States. The duty on the German ground barytes is $5.25 per ton, and during the tariff revision a strong effort was made on the part of the American producers to increase this duty to $10.50 per ton. The German barytes does not require bleaching with sulphuric acid as does the American product. The best barytes, however, is that which is water floated, there being but two mills in the United States using the water-flotation process.

Barytes has been used by many paint manufacturers for more than 50 years, but in too many instances it was done in such a way that it has gained discredit by having been used as an adulterant. Recent tests, made by the Paint Manufacturers' Association of the United States, have shown that a combination of one-third, each, barytes, zinc white and white lead, has given good results as a pigment. As much as 60 per cent. barytes and 40 per cent. zinc have given excellent results. There is no objection whatever in the use of barytes when it is given as an ingredient of the paint, and sold as such. Barytes as a single pigment is not a success. The principal use of the imported crude material is for the manufacture of lithophone and barium salts.

Market Conditions

The domestic barytes, most of which is mined in Missouri, Tennessee, North Carolina and Kentucky, is delivered f.o.b. cars at the mine at $3 to $4 per ton. These mines are so far from the Atlantic ports that railroad rates prevent competition with the foreign product. The domestic production is usually 38,000 to 40,000 tons per year. The general business conditions of the country being a little below normal in 1910, it is doubtful whether the total production will reach 35,000 tons. The price of American ground barytes, f.o.b. New York, varies from $12.50 to $15 per ton, depending upon the grade. The American floated has a limited market at about $18 per ton while the foreign floated barytes sold for $21.50 per ton, f.o.b. New York.

One of the new barytes properties that recently began shipping is in Merced county, Cal. The advent of the Merced Valley railroad places this property within reach of the San Francisco market where the hand-picked and cobbed material is shipped and delivered to the users at about $11 per ton. Another deposit was opened recently near Hailey, Ida., but the freight rates are such that it cannot be shipped to San Francisco, which is its nearest market.

Orford's Twin Chimneys

At the Orford Copper Company's works at Constable Hook, Bayonne, the new chimney, twin to one built a short distance away 11 years ago, has been finished. These chimneys are among the very tall chimneys in the world. Their tops are 365 ft. above the foundations.

The new chimney rests on 400 piles driven 14 ft. into the earth and filled in with concrete. It will withstand a gale of 100 miles an hour. It is built of perforated radial bricks that weigh from 15 to 18 lb. each, acid proof and set in acid-proof mortar. It is 10 ft. in diameter at the top and is provided with an outside ladder and lightning rods. If ordinary-sized bricks had been used about 2,000,000 would have been required. The chimney weighs about 4000 tons and cost not far from $40,000.

Russia has one Héroult electric steel furnace installed at the Obuchoff works, St. Petersburg, and two contracted for, to be at the Actien Gesellschaft der Eisen- Stahl- und Mechanische-Werke, Sormovo, and the Société Générale des Hauts Fourneaux, Forges, et Aciéries en Russie, at Makieva. Each of the two last will be a 3-ton furnace; the first is of 3½ tons capacity.

The Growth of the Southeast Missouri Lead District

By H. A. Wheeler*

Waves of activity and depression have repeatedly followed one another for over a century in Washington county, and to a more limited extent in Jefferson and Franklin counties. Similar irregularity characterized the outputs of St. Francois and Madison counties before the deep, large bodies of disseminated ore were discovered by the diamond drill.

How much longer Washington and the more northern counties will have to await the development of the disseminated orebodies that probably occur under the shallow lead, is still indefinite, but the heavy drain that the present large mills are making on the St. Francois county orebodies is accelerating the day when they will be thoroughly prospected. What little drilling has been done in Washington county was encouraging, in showing some lead and the same favorable formation as in St. Francois county, while the surface deposits are richer and much more abundant. The fear of the depth of 800 to 1200 ft. that will prevail in Washington county now appears less formidable, since the later disseminated mines are 500 to 700 ft. deep, where formerly they were only 100 to 400 ft. The reputed difficulties of diamond drilling in Washington county have been greatly exaggerated, as the attempts have usually been made by St. Francois county trained drillers, where the conditions are so exceptionally favorable that it only costs 40 to 80c. per ft., and farm hands run the drill after a few months' experience. While the overlying Potosi limestone formation in Washington county has occasional flint seams and some openings, it does not present the difficulties that are usually found at Lake Superior and many Western mining camps. This is forcefully illustrated by recent contracts having been made with reliable contractors to drill to depth of 800 to 1000 ft. at $1.25 to $1.50 per foot, as against rates of $2 to over $5 per foot that prevail at all other mining camps outside of the Missouri lead belt that I am acquainted with.

Growth of Disseminated Lead Belt

To appreciate the consistent and remarkable growth of the Missouri disseminated lead belt, the accompanying figures are presented, showing the estimated annual production of pig lead since 1900. As the tonnages in the Journal's annual reviews have to be arrived at in December, it is estimated for that month. The data prior to 1903 were

*Mining engineer, 510 Pine street, St. Louis, Mo.

obtained from the annual reports of the Missouri mine inspector.

As part of this district has been producing for two centuries and most of it for at least one century, such a record is unique, as well as highly impressive in American mining practice. It is true that the output was small and was derived from the shallow deposits, or "diggings," prior to 1865, which had shown a general, though irregular growth. In 1864 the St. Joseph company acquired its first holdings at Bonne Terre, and shortly after made the pioneer effort to produce lead from the disseminated type of ore, though on a small scale until 1883. As the shallow lead usually occurs in chunks and large crystals, hand cleaning was sufficient to bring it up to about 80 per cent., and a few jigs and bucking boards were the extent of the previous milling plants, if the rains did not wash off the adhering clay. In the decade from 1870 to 1880, the Mine La Motte Company, Madison county, and the first Desloge company at Bonne Terre began to work the disseminated ore with mills of 150 and 300 tons, respectively. When a narrow-gage railroad was built jointly by the St. Joseph and Desloge companies in

PIG LEAD PRODUCTION OF THE MISSOURI DISSEMINATED LEAD BELT.

	Short Tons.		Short Tons.
1900	40,000	1906	88,000
1901	50,000	1907	98,000
1902	61,000	1908	104,000
1903	65,000	1909	128,000
1904	73,000	1910	140,000
1905	82,000		

1880 from Bonne Terre to Summit, 12 miles west on the Iron Mountain railroad, the foundation was laid for the present prosperity. It was a cheap road with 3 per cent. grades and excessive curves, but it cut out several hundred teams that struggled with light loads over bad roads in hauling out lead and bringing in supplies.

The only new producer developed in the decade ended in 1890 was the Doe Run company. Its success in finding disseminated ore in the Flat River basin stimulated the opening up, in the following active decade, of the new Desloge mine on Big river and the Central, Taylor, Donnelly, Leadington, Derby, Theodora, Union and Columbia mines at Flat river. The Desloge company started in 1892 with a 500-ton mill, which was one of the largest and most impressive in the district, and it has grown steadily ever since. The other companies started with mills of 100 to 200-tons capacity, but have disappeared by absorption. The National Lead company acquired the Taylor property in 1897; the Doe Run company bought the Donnelly and Columbia properties; and the Federal Lead company secured the Union, Derby, Leadington, Theodora and Central lands, of which the latter was developed to an important producer, with its own railroad, mill and smeltery, and had made an enviable dividend record.

The Decade Ending with 1910

The mines opened in the decade ending with 1910 were the Irondale, in Washington county, since absorbed by the Federal Lead Company, and the Catherine, North American and Hudson Valley mines, in Madison county, none of which were large producers. This decade was most eventful in St. Francois county, as it witnessed the development of the present large mills of 1200 to 4000 tons capacity, with the great increase in the mines and railroad facilities that such large daily requirements necessitated.

The new decade finds the five large St. Francois county producers in excellent condition to produce lead cheaply with their large tonnage and modern plants. Their construction work is essentially finished; the mine developments are ample to meet present requirements and the labor problem is in much better shape than in most mining camps. The most important problem of the new decade is to maintain the present large output, which is at a pace that will draw heavily on present developments. Most of the companies have such large land holding as to possess large areas of virgin ground that may prove amply able to sustain present requirements. Some of them will have to acquire more property, and as desirable lands within the lead belt have been pretty well bought up, it will necessitate prospecting in the adjoining counties, where there is much promise of duplicating the success of St. Francois county. The future of the lead belt, therefore, seems to be amply assured.

Tennessee Copper Company

By the beginning of 1911 it is expected that the sulphuric acid plant will be ready for operation at full capacity. It is stated that this plant when completed will have cost $1,750,000. It is not probable that the copper production will vary much from the present annual rate of about 14,000,000 lb. President Lewisohn is authority for the following:

"The annual capacity of our acid plant will be 225,000 tons of acid of 60 deg. B. It is expected that the acid can be produced at a cost less than $2.25 per ton, while long-time contracts for the sale of large amounts have been made at or better than $5.25 per ton. I estimate net profits for next year at $1,000,000.

"'At the end of 1910 I expect ore reserves will approximate 4,500,000 tons as compared with 4,172,311 tons at the end of 1909 and 1,500,000 tons on Dec. 31, 1901. There are indicated further reserves estimated to be sufficient at the present rate of production for the next 25 years."

Platinum Production in 1910

Efforts were made in 1910 to increase and systematize the production of platinum in Colombia, where it is found in placer workings over rather a large range of territory. Heretofore the supply depended chiefly upon native workers whose methods are primitive, and who are not given to preseverance in their labor. Late in 1909 two small dredges were installed and these are reported to be working successfully, though we have no returns of their production. Exports from Colombia are made usually by the commission merchants, who take the metal in payment for goods, and ship it to the United States or Europe when they have accumulated a quantity. Their shipments are all of crude metal, there being no refinery in the country. Colombian crude platinum is said to be usually of a little higher grade than the Russian. There is little doubt that the production could be considerably increased.

Russia

In 1909 the production of platinum in Russia was 523.5 poods, or about 275,000 oz.; this includes an estimate for the metal which is surreptitiously exported, to evade payment of the government tax. In 1910 the exports for the first half of the year were officially reported at 150 poods —or 78,930 oz.—an increase of 35 poods over the first half of 1909. This indicates some increase in production. It is certain that the placers of the Urals were worked intensively, both by the large and small workers, on account of the strong demand and high prices. An expert estimate puts the production in 1910 at 570 poods, or about 300,000 oz. of crude metal, 83 per cent. platinum.

The industry in Russia is pretty closely syndicated, between 85 and 90 per cent. of the total being handled by two companies—the Société Industrielle du Platine, and the Petersburger Gesellschaft Platina. Both of these companies in turn are largely under the influence of the Société Anonyme d'Industrie du Platine, of Paris, which practically controls the platinum industry. The Russian government undertook two years ago to protect the small producers by arranging to make advances in money to them and by handling their product through a central agency; but little or nothing has come of this movement, chiefly because of the opposition of the large companies.

Gold receipts at the Australian mints nine months ended Sept. 30 were: Sydney, 424,910 oz.; Melbourne, 573,627 oz.; total 998,537 oz. Of the total receipts 817,514 oz. came from mines in Australia; 150,361 oz. from New Zealand; and 7036 oz. from New Guinea.

Coal Mining Department

The Coal Trade in Ohio during 1910

By George Harrison*

The coal industry in the State of Ohio for the year 1910 was one of unusual activity both in the number of tons reported to be mined, and also in the increased earnings paid in wages to the miners, resulting from the general impetus of the coal trade.

From reports received from the various mining districts of the State, the production has evidently increased over that of 1909, by about 3,000,000 tons. This would bring the tonnage up to over 32,500,000 tons.

With the exception of time lost in districts where there was difficulty in making settlements based on the new wage-scale agreement the mines of the State were operated about three-fourths time.

Districts

The Hocking Valley and Eastern Ohio districts will contribute more largely to this predicted increase than any other fields in the State. The protracted idleness in the Crooksville district will decrease the output from that locality, which was idle from April 1 until Nov. 8, when work was resumed pending an investigation and report by a reference committee in regard to the differences arising between the miners and the operators over the wage-scale agreement as applied to this particular district. The Tuscarawas district also experienced the same difficulty, and the mines there are still closed, pending an amicable adjustment.

It is reasonable to presume that the number of employees in the State will be nearer 50,000 than less than that number, as 47,000 were reported from the different mines during 1909. Many men are said to have deserted districts where settlements have been long drawn out and have located in others, while some may have left the State altogether.

Fatalities

Up to the middle of December, 154 fatal accidents were reported, and at the same proportion the number for the year will, in all probability, reach 160, possibly more. This number includes 15 persons who lost their lives at the Amsterdam mine by an explosion of gas, caused by the air being short-circuited, due to the opening of a door. This is the greatest number of fatalities ever recorded in the history of the department, the number in 1906 reaching 153. The number of persons killed by high-speed haulage motors, mining machinery and mine cars is increasing annually. The desire to increase the tonnage of mines to their greatest capacity and the wilful recklessness and disregard for law and orders for their own safety by employees are clearly accountable for much of the increase in the fatalities during the year.

*Chief inspector of mines, Columbus, Ohio.

The Important News Of Coal Mining: New Appliances, New Methods, New Fields, Colliery Engineering

Legislation

The new mining code which was submitted to the General Assembly in January, 1910, passed both branches of the legislature without a dissenting vote, and by virtue of its provisions went into effect June 11, 1910.

The vast amount of work entailed in an undertaking of this kind can scarcely be appreciated by the individual, but when we take into consideration the fact that no great changes had been made in the old law since its first enactment in 1874, and that up until the year 1908 no mention of the term "electricity" was to be found in it, the urgent need for such a revision was plain to all interested in the industry. This code was prepared and submitted to the Governor by three miners and three operators, and a seventh member chosen by these six members.

Essential Features of New Law

The most essential features of this new law are those providing increased ventilation, both for the persons employed and for the number of animals in use; fireproof stables in shaft mines; the number of escapement ways, protection from electric wires and electricity as applied in operating mines. Penalties have also been provided for all persons employed in and around the mines who violate the law. These are only a few of the most essential features of this code. Fines have already been imposed, amounting to over $600. The greatest number were for persons burning oil mixed with carbon, seven in all; six for machine runners operating a mining machine without a shield; two for loitering about the premises of coal companies; four for entering a mine before being examined by a fire boss; two for crossing a danger signal; two for failure to provide suitable timber; one for propping open a mine door, and one fire boss for failure to report the condition of the old workings after examining them. Several oil companies and retail dealers were also convicted and fined for selling impure oil and not having barrels properly labeled. These are the most important, and no doubt the moral influence of these arrests will result in fewer offenses in the future.

Early reports indicate that the lake trade was good, and that the total volume of this class of coal shipments was satisfactory; it is believed the lake tonnage has broken all records.

No strikes of a serious nature took place during the year, except in the localities already mentioned. The general outlook for the year 1911 is fairly good, especially if some satisfactory adjustment of railroad rates can be made in connection with the large shipments which are annually made to the Lakes.

Coal Mining in Alabama

By James Hillhouse*

Indications in Alabama now point to an output of approximately 15,000,000 tons of coal for the year 1910. The production in 1909 was 13,790,268 tons. I feel safe in saying that from 65 to 70 per cent. of the coal is mined and shot with permissible explosives which have passed the Government's test. There were no strikes in Alabama in 1910. The scarcity of railroad cars played a prominent part in the last three months of 1910, and it seemed as if the railroads could not handle the entire production of coal.

There were two serious disasters or explosions of gas and dust, resulting in the loss of 139 men. The first accident occurred at the Mulga mine, which is owned by the Birmingham Coal and Iron Company; in this disaster 40 lives were wiped out on April 20. The Palos explosion occurred May 5, 1910, and caused the death of 91 men. We also had two local explosions during the year. One at the Yolande No. 1 mine, in which five men were killed. Three of these were burned to death and the other two were slightly burned, but we believe that these

*Chief mine inspector, Birmingham, Ala.

miners were completely overcome by the afterdamp, which caused their suffocation. The following is a list of the causes of the deaths of the men who otherwise lost their lives:

FATALITIES IN ALABAMA COAL MINES IN 1910.

Falls of rock	47
Falls of coal	4
Falls of rock and coal	4
Tram cars	17
Machinery	1
Electrocuted	6
Electric motors	3
Going back on shots	4
Explosion of gas and dust	139
Premature explosions	6
Miscellaneous	4
Total	235

The Mines Are Well Sprinkled

The mines were well sprinkled by water pipes, and the various companies flushed the top, sides and bottom and have sprays installed at 200-ft. intervals. In this way we can feel reasonably safe when we know that our recommendations are complied with by keeping the mines in a damp and moist condition. The cure and preventative for gas is plenty of air. When a mine generates gas, every precaution is taken to guard against accumulations of it by thoroughly ventilating and allowing plenty of fresh air in the mines. I feel happy to say that the majority of the operators are co-operating with us, and it is seldom that any of the mine owners fail to comply with the inspectors' recommendations.

I find as a rule that the ventilation questions of the mines are carefully attended to, and that most of our workings are well ventilated. We all, as mining men, realize the great necessity of good ventilation, especially in the winter months; therefore, the mine inspectors have taken unusual pains to call the operators' attention to any defects in ventilation, and to see that remedial suggestions are carried out.

Education Reduces Mine Accidents

J. P. Moore, State mine inspector for the first anthracite district of Pennsylvania, stated that the educational work among the miners in his district has had the effect of reducing accidents by 50 per cent.

The mining institute at Carbondale, Penn., the center of the first district, is supported by the Pennsylvania Coal Company and the Hillside Coal and Iron Company, known as the Erie companies; the Temple Iron Company and the Delaware and Hudson Company, acting in cooperation with the Anthracite Committee of the Y. M. C. A. Inspector Moore made the statement as to the reduction of accidents at the opening of a new institute that the Susquehanna Coal Company is starting in Shamokin, Pennsylvania:

"I have occasion to know what the work has accomplished," he said, "because it is my business to collect the statistics of accidents to life and property. This institute work is the most useful agency yet devised to reduce accidents in the mines. It teaches the men to protect themselves and others. 'First Aid to the Injured' is a good institution, but I call the 'First Aid to the Uninjured' still better. Prevention is better than cure."

Coal Mining in New Mexico in 1910*

By Jo E. Sheridan†

The demand for the product of New Mexico coal mines was remarkably constant throughout 1910, the orders for coal during the summer months being fully equal to the production of the mines. As the winter months approached, all the coal mines of the Territory were offered orders in excess of the capacity for production, which is restricted by scarcity of miners, and was slightly lessened by lack of transportation facilities while the corps were being marketed from the agricultural States. It is quite probable that part of the constant and increased demand was attributable to the strikes in the northern Colorado field, and in the middle-west coalfield, which diverted part of the coal produced in the Colorado and Wyoming fields to the markets theretofore supplied by the mines closed by the strikes, thus taking the Colorado coals out of competition with the steam coal of New Mexico in the markets in the southwest and in Mexico.

However, the rapidly increasing population of the West, together with the development of its manufacturing industries, is responsible for the major part of the demand for coal from these mines, and it is quite safe to assume that the demand will continue to increase from year to year fully as fast as in the past decade.

The domestic coal of the Raton field in New Mexico has invaded the markets of Kansas and Oklahoma and farther east, finding great favor and taking preference over other coals offered in those markets for domestic purposes. So great has the demand become for this New Mexico coal for domestic uses that the mines have been behind on supplying orders throughout the entire year.

The mines could easily keep pace with the demand for the domestic coal if the smaller sizes used for steam purposes were in equal demand. But the quantity produced of lump, egg and nut coal, suitable for domestic purposes, is dependent upon the opportunity to dispose of the still smaller sizes for steam purposes without loss to the mine operator.

The coal from the Gallup field enjoys equal favor in the domestic markets at home, and on the Pacific coast, where it practically monopolizes the domestic coal trade, although other coals are offered at less prices.

Production Showed Large Increase

The gross production was 3,616,665 tons, an increase of 606,665 tons, or 20.15 per cent. over 1909. The amount of coal used for operating purposes was, 42,347 tons; 884,287 tons of unwashed slack and coal was sent to the washeries and coke ovens, and 2,690,031 tons of coal was shipped to market. The price averaged about the same as last year $1.35 per ton at the mines, the total value of coal marketed being $3,631,541.85. Coke produced, 401,949 tons valued at $3 per ton at the ovens; total value of coke made, $1,205,847, or a combined value of $4,837,388.85 for coal and coke marketed from the mines of the Territory during the year.

The number of miners employed was 2100; companymen underground, 600; boys underground, 44; total number of persons employed underground, 2744. Three hundred and sixty-five men and 27 boys were employed outside immediately at the mines, making a total of 3136 persons employed underground and on top at the mines.

Fifteen men were killed in the mines during the year, or 4.78 for each 1000 persons employed, or 0.478 per cent., as against a percentage of 0.347 per cent. in 1909. Nine of the fatalities were due to falls of rock; five to falls of coal, and one by picking into a missed shot. Lack of discipline in the mines is responsible for the great number of accidents. Miners resent being instructed to take proper precautions for their own safety, and discipline cannot be enforced without legal authority. The laws governing the operation of coal mining in the Territory are of little value. The principal mine operators expended considerable sums, and made many improvements in mining methods, tending to the safety and protection of their employees.

As heretofore, the use of fuel oils from Texas and the Indian Territory has curtailed the demand for coal in the markets of the southwest, especially for railroad locomotives; similar conditions have obtained upon the Pacific coast and for a thousand miles east from San Francisco, along railroads which formerly used coal for fuel on their locomotives.

Labor conditions were satisfactory at the mines both to the operators and employees, and there is every indication that these desirable conditions will prevail throughout the ensuing year.

*Published by permission of J. A. Holmes, Director of the United States Bureau of Mines.

†United States mine inspector for New Mexico, Silver City, New Mexico.

Coal Production in Iowa in 1910

By James H. Lees*

The coal-mining industry in Iowa showed progress in 1910 in spite of the suspension during negotiations for the new wage scale. This is shown by the increased output and by the larger force of employees, as well as by improved conditions in and about the mines. Indeed in some respects the cessation of work during April and early May was beneficial rather than otherwise. On the part of the miners, it gave them a brief rest, not too protracted, and put them in a frame of mind to appreciate and abide by the new agreement. On the part of the operators, they were able to put their mines in better shape for resuming work than would have been possible while mining was in full progress. Further, the fact that Iowa mines were reopened after only six weeks of idleness, while those of surrounding States, as Illinois, Missouri and Kansas, were shut up for four or five months, gave such an immediate impetus to the market as to offset in large measure the loss incurred during the idle period.

Production in Iowa Shows Increase

The output of all grades of coal from Iowa mines in 1909 amounted in round numbers to 7,660,000 tons. This total came from 305 mines and 19,178 miners; other inside and outside men received employment during the year. The first inspection district, which embraces the southwestern part of the productive field, mined 2,475,000 tons, employed 7155 men and operated 118 mines. In the second district, the southeastern coal counties, 111 mines were worked and 5300 men produced 2,550,000 tons. The third district covers the northern part of the coalfield, and here 2,635,000 tons were mined. Seventy-six mines were operated, manned by 6,523 employees.

The figures given by the State Mine Inspectors in their recent reports show that during the year ending June 30, 1910, the output was 7,222,480 tons, from 297 mines, and that 18,005 men and boys were employed. It must be remembered that this period covers the six weeks during which the mines were idle and that as a result, the output would naturally be less than during a period of ordinary activity. Again, as already suggested, the idleness of the mines of other States led to the Iowa mines being worked on nearly full time all through the summer months, and during the latter part of the year, the cold weather naturally increased the demand for coal.

*Iowa Geological Survey, Des Moines, Iowa.

It is probable that fully 40 per cent. of Iowa coal is used by the railroads. The almost unprecedented crops, the consequent heavy traffic, both passenger and freight, the larger amount of coal required to pull a train in cold weather, all these factors point toward an increase in demand. Similar conditions hold good with regard to the commercial users of Iowa coal. Business is developing rapidly in Iowa in these days and there must follow the consumption of a larger volume of fuel. If the briquetting of coal slack and waste can be made a commercial success in Iowa it will mean a great saving in every branch of the coal trade—to producer as well as to consumer.

Mining Cost Increased 13 Per Cent.

With regard to the new wage scale and working agreement it may be said that while the cost of each ton of coal mined increased, the agreement is advantageous to both employers and employed. Wages were increased 5.55 per cent., which means that the ultimate cost per ton for mining has increased about 13 per cent. Iowa operators have always felt that they were working on too narrow a profit margin and this increase in cost enables them to ask more for their coal from the market.

The outlook for 1911 is good. As stated in the 1909 review, new fields are being prospected and developed, and several large producers will be in position to increase their output or to enter the market this year. This development is chiefly in the southeastern field and in extensions along the western margin of the territory already exploited in central Iowa.

Accidents Due to Careless Use of Explosives

Special Correspondence

From time to time at coal mines, accidents are reported in connection with the use of explosives. Everyone knows that an explosive is a dangerous thing to handle, but the employment of ordinary care and the observation of well defined regulations should reduce to the minimum the risk of accident. This has been demonstrated by the coal-mining community in the county of Durham (England), where, in 1909, no fewer than 7,708,476 shots were fired, and 4,396,569 lb. of explosives were consumed. These are somewhat impressive figures and, considering the use of nearly 2000 tons of explosives, it is satisfactory to learn that there were only one fatal and 32 nonfatal accidents charged against the use of powder, three-fourths of which was ordinary gunpowder.

Details of a Fatal Accident

The only fatal accident was due to the carelessness or thoughtlessness of the victim himself, a stoneman, who was working with a shotfirer taking down a top caunch. The circumstances were these: A shot was charged and seemed ready for firing. The man then went outbye on the haulageway to prevent anyone approaching the shot while it was being fired. After connecting the cable to the shot, the shotfirer went inbye, and there he connected the other end of the cable to the battery and fired. On walking up to see the result of the shot, the shotfirer was horrified to find the man who had gone outbye to prevent anyone approaching, lying four yards on the inbye side of where the shot had been and terribly injured.

As the inspector says, this accident should not have happened. Clearly the victim paid the penalty of his own carelessness in neglecting the rule of the colliery when explosives are used. He left his post; and it is perhaps fortunate that others in the mine had no occasion to travel that way during his absence from duty while the shot was being fired. It is somewhat curious that the only fatal accident from the use of explosives in Durham in 1908 was attended by similar circumstances, showing how unfortunate may be the result of neglect of duty and of rules.

A Case of Carelessness

Even in the thawing of explosives there is greater need for the exercise of ordinary precautions than many miners concede. As a warning a case may be cited. A man died from the effects of nitroglycerin poisoning. The explosive used was gelignite, and from the report it appears it was the custom of the deceased man and his mates to place the explosive, after removing the wrapper, inside their shirts in contact with the bare skin. Some of the nitroglycerin exuded and was absorbed through the skin.

R. Donald Bain, the Durham inspector, recalls a similar case some years ago when some men who were employed in driving a stone drift and using nitroglycerin compounds, developed a red rash somewhat resembling scarlet fever, accompanied by intense irritation. They recovered after being at home a few days wearing their ordinary clothes, but in some cases after returning to work the symptoms recurred. For some time the doctors were unable to trace the cause, but it was subsequently found that it was the custom of the men to carry the explosive in their trouser pockets to keep it soft. The nitroglycerin exuded and their clothes became saturated with it, and this, aided by the friction of their clothes against the skin when working, caused the trouble.

The remedy against this class of accident of course is the provision of proper warming pans which should be kept ready for use. As the inspector points out, these natural warming pans, though eminently portable and no doubt effective, cannot be made use of without incurring considerable risk.

A Departure in Settling Petty Coal Strikes

SPECIAL CORRESPONDENCE

During the past 12 months, or even longer, the officials of the Pennsylvania Coal Company have been worried and harassed by small strikes at their mines, and by one strike last summer which threatened to become general and which did shut down eight or nine mines, involving some 12,000 men. The officials of the company as well as the members of the Conciliation Board came to the conclusion that this state of things had become intolerable, and that something had to be done to end it one way or another.

The men who go on strike claim that the company is not living up to the terms of the three years' agreement. The officers of the company claim that not only are they living up to the terms of the agreement, but that in innumerable instances they have and are now interpreting that award in favor of the men. Those who know the general manager of the company, Capt. W. A. May, are fully aware that he is the last man in the world to take advantage of any technical qualification in the interpretation of the anthracite award, that might seem to favor his company, or to permit any of the officials under him to do so. On the contrary, it is generally known that Captain May is one who will always strain a point in favor of the miners rather than permit the economic waste that is the result of petty local strikes.

Time and again cases of this kind have been brought before the Conciliation Board, adjudications are handed down and seemingly accepted by the representatives of the men, only to be repudiated by the miners when the award, whatever it may be, is sought to be put into effect.

ITALIANS ARE TRACTABLE, BUT IMPETUOUS

The Pennsylvania Coal Company has some 20 mines in Luzerne and Lackawanna counties and employs between 15,000 and 16,000 men. Among the employees of these mines, there is a disproportionately large number of foreigners in comparison with other mines. A good many of these are Italians. The Italians, as a rule, who go to work in the mines, are more tractable and more intelligent than the Slav miners. But they are more impetuous, and see efforts made to drive them or oppress them when that is the last thought that enters the foreman's head. The national psychology of the men working in a mine has a great deal to do, not only with its productive administration, but with its economic working.

The members of the Anthracite Conciliation Board at its last meeting came to the conclusion that if peace was to be permanently established at the Pennsylvania Coal Company's mines, they should investigate the grievances or alleged grievances directly. Every member on the board is either a practical miner or a practical mining engineer. The members of the board will visit each mine at which there is or has been trouble. They will go into the mine, accompanied by representatives of miners and the officials of the mine. Instead of hearing the evidence in a courtroom or in a hall, they will ascertain the facts on the spot, not merely the facts in any particular matter in dispute, but upon the general conditions of the mine, particularly those of which the miners complain.

MEMBERS OF CONCILIATION BOARD TO SEE FOR THEMSELVES

After having made this investigation, the board will go into session and hear any other evidence that may be brought before them, or which they think that they may need in coming to a conclusion.

When the members of the board go into a mine, they will go directly to the chamber where the man is working. They will ask him to explain where his grievance lies and how far it extends. In this way the truth will be ascertained, because the individual miner will neither be able to deceive nor exaggerate conditions which are as familiar to the members of the board as they are to himself. It is hoped that in this way a road out of the difficulty will be discovered and applied, not only to the mines of the Pennsylvania Coal Company but to other mines as well.

The coal companies are heartily in favor of this new departure in the procedure of the Conciliation Board, and while the board is only concerned with the disputes at the Pennsylvania collieries, it is possible that they will adopt this plan in investigating disputes at all of the mines at which difficulties of a similar character are encountered.

The growth of the coal-mining industry in the Roundup district, Yellowstone county, Mont., during the last year has been most remarkable. Two years ago there was practically no coal mining in this field, while at the present time the mines are producing about 4000 tons daily; half of this output is consumed by the Chicago, Milwaukee & Puget Sound railway, and the remainder by the cities of the Northwest. About 1000 men are employed in the coal mines of the Roundup district.

Manufacture of Briquets in Holland

According to Consul Mahin, of Amsterdam, Holland, large quantities of briquets made chiefly of peat and charcoal are used in that country. Practically no coal is mined in Holland. In former years lignite was used as a fuel, but many difficulties attended the use of this latter product and, as a consequence, briquets have come into general use.

In the early stages of briquet manufacture, the work was done literally by hand and foot. A clever workman could make 1200 briquets in 10 hours; however, such briquets lacked cohesive properties, which defect made them totally unfit for transportation.

PRESENT METHOD OF MAKING BRIQUETS

By the present method of making lignite briquets, the moist coal as it is raised from the mine is crushed fine between heavy rollers and then dried in ovens till only 5 to 15 per cent. of moisture remains. It is not completely dried, as that would reduce its plasticity. Then a stamping press shapes the mass into briquets, under a pressure of over 1000 atmospheres, and the drying occurs in specially built ovens. In certain cases, as coal dross, for instance, the material requires the addition of a cohesive substance, coal tar or a species of rosin being used, which is added in a pulverized or melted state. This mixture is made into briquets under a pressure of 100 to 200 atmospheres.

The foregoing description applies, in a general way, to the manufacture of briquets from charcoal and peat in this district. The briquets called charcoal are composed chiefly of that material, with the addition of other combustible substances, such as tar, saltpeter and charred peat. The relative proportions of these ingredients is a trade secret.

Briquets are specially made in Holland for various definite uses. Certain peat-charcoal briquets are used in the casting of steel, for which the low percentage of sulphur they contain makes them peculiarly suitable. Another briquet is for use in a flatiron. It is heated on a spirit lamp or in a fire, and when put in the flatiron will, it is said, give out a steady heat for eight or ten hours, and thus prove a great aid to laundry work. Besides these special kinds, varieties of briquets are made for burning in stoves, where they are employed either as the sole fuel or for lighting anthracite coal, which is much used in heating stoves.

A considerable export trade in Dutch briquets has been acquired, especially with England, and it is believed that the recent introduction of the most improved manufacturing facilities will much increase that trade.

Mine Disasters Attributed to Foreign Workmen

SPECIAL CORRESPONDENCE

The commission appointed by the governor of Colorado to examine into the causes of coal-mine explosions has already begun public hearings. Many interesting points are sure to be brought out by this investigation. One of the mine superintendents in Colorado attributes the great losses of life to the employment of foreign miners. This official says: "The numerous mine accidents are caused by the miners themselves. I do not mean the American and English-speaking miners, because these men are generally willing to live up to the rules made by the company. However, I do refer to the foreign workers, and I know, from personal observation, that these latter men will violate every rule that a company can make. They know that they are not allowed to carry matches into a mine, yet they do it continually.

MINERS CARRY MATCHES UNDERGROUND

"It is an impossibility to keep these foreign miners from smoking cigarettes, and often, when I have searched them before allowing them to enter the mine, I have found matches, pipes, tobacco and cigarette papers hidden in their socks, inside their shirts, and under their caps. These fellows think it is smart to know how to unlock a safety lamp and light it right at the face of the breast, where they are breaking down coal.

"For the offense of unlocking and relighting a safety lamp inside a mine, the Victor-American Fuel Company had two foreign miners arrested, and at the time I write this letter they are in jail at Trinidad. One was sentenced for six months and the other for three. In my opinion they should have been lynched."

James Dalrymple, newly appointed inspector of coal mines in Colorado, succeeding John D. Jones, indorses the statements of Mr. Quinlan's letter: "Coal mining would be rendered vastly safer if a more intelligent class of men could be secured to work in the mines," says Mr. Dalrymple.

THE EQUIPMENT AT SOMERSET

Another letter comes from a miner at Somerset, Colo., and tells of the efforts that have been made by the Utah Fuel Company to make its coal mine at that place one of the safest in Colorado. From the writer's description of the equipment of the Somerset mine one would get the impression that it is a close rival to the model coal mine at Cokedale, a few miles from the ill-fated Starkville colliery that was wrecked by a terrific dust explosion Oct. 9, when 67 miners were burned to death.

"The Utah Fuel Company has a system of sprinkling its Somerset mine regularly every day," says the writer of the last letter, "and they have water mains in all entries, crosscuts and rooms.

"The sprinkling crew makes its rounds to all the places every third day, and when a room gets dusty, there is hose ready at hand, which the men can use themselves to sprinkle the coal before they fire a shot."

The miner from Somerset says the company is particular about men carrying powder into the workings, limiting each digger to a single "powder jack" containing six and a quarter pounds.

In eight years of operation at Somerset only three men have lost their lives and 15 have received injuries in accidents.

This mine has introduced a decided novelty in the form of separate roadway for the miners to enter and leave the workings, thus doing away with the necessity of their traveling along the haulageways, and providing an additional avenue of escape in time of danger.

Two points of marked difference between the Somerset mine and the three collieries which have become famous through appaling explosions, are its complete telephone and electric lighting systems.

One of the first things the rescue workers did at Starkville after the blowup was to rig up a portable telephone that could be carried into the mine by each shift of searchers for living or dead victims.

TELEPHONE AND ELECTRIC LIGHTING SYSTEMS

During the anxious days at Delagua, when the work of recovering the 79 bodies entombed in the mine was slowly going forward, one of the comments most frequently heard was on the company's neglect to install a telephone system in the mine.

Neither Primero, Starkville nor Delagua mines were lighted except over a short length of the main entry. At Somerset the main slope and the main haulway are electrically lighted throughout.

The Utah Fuel Company goes a step farther and uses its big electric power plant to furnish current for lighting the homes of the miners.

The Somerset correspondent urges that a law be passed by the Colorado legislature compelling every applicant for a position inside of a coal mine to undergo an examination to test his knowledge of coal mining and his appreciation of its risks.

State Mine Inspector Dalrymple was shown this letter and asked if its statements are true.

"I have never been inside of the Somerset mine," he said, "but I know, from what my predecessor, Mr. Jones, told me frequently, and from knowledge gained from other reliable sources that the mine at Somerset is one of the most intelligently conducted mines in Colorado.

"In regard to the enforcement of an examination for applicants for places in mines," said Mr. Dalrymple, "I am not prepared to indorse that suggestion unqualifiedly. It would undoubtedly be a fine thing if it were practicable. But I have serious doubts as to the possibility of putting such a plan into effect."

COLLIERY NOTES

Senator Johnston's bill, releasing coal lands in Alabama for entry has been reported from the committee on public lands.

D. B. Dowling, of the Canadian Geological Survey, who has been engaged during the past season in exploration work along the line of the Grand Trunk Pacific Railway, in western Canada, reports the discovery of coal deposits of considerable area and of good quality 200 miles west of Edmonton. One of these is in the neighborhood of Jasper park, and another near Brule lake. These finds are regarded as of much importance to the railway, as there is little coal between these fields and the Pacific coast, and to the east there are no deposits which are suitable for steam purposes.

A force of men employed by the Girard Estate of Philadelphia, have been engaged for some time drilling for water on Locust mountain, near Shenandoah, Penn.; instead of finding water, they have just struck a seam of the very best anthracite coal at a depth of 500 ft. It is now proposed to determine the extent of the coal, and it is semi-officially announced that there are a number of seams. This discovery means new life and greater prosperity for the Shenandoah district. The coal area discovered seems to extend from Shenandoah to Girardsville, six miles distant; the deposit has an average width of about two miles.

The peat plant installed by the Canadian Department of Mines at Alfred has turned out several hundred tons of peat, which is to be sold in Ottawa at the rate of $3.25 per ton, delivered. This is being done as a demonstration of the commercial success of government experiments in preparing the peat for fuel purposes. The department claims that at this rate peat is equal to the best anthracite coal at $6 per ton. The department also announces that peat can be sold for fuel at the works at a profit of $2.25 per ton; this price is equal to hard coal at $4 a ton. It is expected that within a short time private enterprise will be putting peat fuel on the market in the vicinity of population centers. The Dorchester Peat Company, with a capital of $75,000 and head office at London, Ontario, has been incorporated to develop the peat fields in that vicinity.

PERSONAL

Mining and metalurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Otto Sussman has returned from a European trip.

C. S. Herzig has removed his office to 42 Broadway, New York.

Kirby Thomas, of the editorial staff of the JOURNAL, has gone to Mexico.

Dr. E. D. Peters' new treatise on copper smelting will soon be published.

Prof. E. C. Holden, of Madison, Wis., visited New York during the holidays.

Pope Yeatman has returned from Arizona. He is going to Chile, this month.

William Weston, of Denver, Colo., has been sick with pneumonia, but is now recovering.

Edwin Ellis White, of Ishpeming, Mich., was married recently to Miss Lulu Agatha Liesemer at Ann Arbor, Michigan.

Albert J. Bone has been appointed smelter superintendent of the Tennessee Copper Company, Copperhill, Tenn.

Charles C. Derby, consulting mining engineer, is removing his office from Virginia City, Nev., to Nevada City, Cal.

Dr. H. M. Ami, for 20 years connected with the Canadian Geological Survey, has asked to be superannuated on account of ill health.

Dr. Eugene Haanel, Canadian director of mines, has returned to Ottawa from Vancouver where he went to inspect the new assay office.

While examining the Grass Creek coal mine, near Coalville, Utah, Dec. 24, J. E. Pettit, State coal-mine inspector, lost his footing and fell a short distance, breaking a rib.

Percy A. Robins, who has been in charge of the McKinley-Darragh mine, Cobalt, Ont., for some years, has been appointed manager of the Hollinger mine, Porcupine.

D. W. Call, recently with the American Steel Foundries Company, has been chosen president of the Allis-Chalmers Company in place of W. H. Whiteside, who has resigned.

H. C. George, who has been director of the Wisconsin State Mining Trade School for the past three years, has resigned to become mining engineer for the Wisconsin Zinc Company.

S. E. Bretherton, consulting mining engineer of San Francisco, who spent Christmas week with his family in Berkeley, will be examining mines near Winthrop, Cal., until Jan. 12, then until Jan. 22 near Seneca in Plumas county.

William Ellis Corey has resigned his position as president of the United States Steel Corporation. He has been president about seven years, succeeding Charles M. Schwab in 1903. It is said that no successor will be chosen at present.

Brandeis, Goldschmidt & Co., London and New York, announce that Paul Koing having accepted a position with the American Smelting and Refining Company they have intrusted Erich Benjamin with the management of their office in New York.

Robert Kann, analytical and consulting chemist, has formed a partnership with R. J. Wysor, in order to extend the scope of his laboratory. Mr. Wysor has been connected for a number of years with the Carnegie Steel Company. The new firm is established at 62 to 64 Gold street, New York.

Roger Hopkins, formerly foreman of the Tyee Copper Company's smelting works, Ladysmith, Vancouver Island, B. C., at present foreman of the Lake Superior Smelting Company's works, Dollar Bay, Mich., was operated on by Doctor Abrahams for appendicitis on Dec. 15; he is now well again and able to attend to his work.

John I. Rogers announces that having resigned one year ago from the Midvale Steel Company, of Philadelphia, to take up professional practice, he has since that time engaged in consultation and design, and has now opened a New York office, which will be his main office. His office is at 165 Broadway.

N. H. Darton, for many years connected with the United States Geological Survey, has been appointed the geologist of the new Bureau of Mines with headquarters at Washington. He will continue his investigations of the geological conditions under which explosive gases occur in coal beds.

W. H. Aldridge has resigned his position as manager of the Canadian Consolidated Mining and Smelting Company at Trail, B. C., to take a position with W. B. Thompson, whose mining interests he will supervise. His headquarters will be at Los Angeles for the present. He will be succeeded at Trail by R. H. Stewart, for several years manager of the Canadian Pacific company's mines in British Columbia.

OBITUARY

Edward L. Dignowity died at San Antonio, Tex., Dec. 26, aged 63 years. He was largely interested in mines in Sonora, Mex., in connection with his brother, Henry L. Dignowity.

Clair Stillwagon died at Connellsville, Penn., Dec. 30, aged 41 years. He was born at Connellsville and lived there all his life. When a youth he worked as a miner and later became a fire boss. On the death of his father he became general superintendent and part owner of the Marietta-Stillwagon Coal Company. At his death he was secretary and treasurer of the Marietta-Connellsville Coke Company at Ligonier; secretary and treasurer of the Opekiska Company, of Opekiska, W. Va.; secretary and treasurer of the Clair & Rockwell Coal Company at Scott Haven. He was interested in other business enterprises and was well known throughout the coke region.

Robert Forrester, of Salt Lake City, died at Seattle, Wash., Dec. 27. Mr. Forrester was born in Scotland, the son of a Scotch geologist of note. His work for many years was in the coalfields and the development of coal properties, his first work being in the Pennsylvania coalfields. For the past 20 years he had been geologist with the Utah Fuel Company, and he had charge of the opening of many coal mines of consequence in Utah and Wyoming. For the past five years his time had been given to the study of methods for the protection of the men in mines and the safety of both life and property therewith. Recently some of his devices and suggestions were adopted by the German government.

SOCIETIES and TECHNICAL SCHOOLS

Geographical Society of Canada—Preliminary steps toward the organization of this body were taken at a meeting held at Ottawa on Dec. 22. Doctor Deville, Doctor Klotz, Doctor Doughty, R. W. Brock and James White were appointed as a committee to draft bylaws, obtain a charter of incorporation and organize the society.

University of Idaho—This institution, at Moscow, offers short courses extending over a period of eight weeks, combining both laboratory and lecture instruction in mining, geology and allied subjects. These courses are designed primarily for men who are unable to take regular courses at the university. They are for the purpose of giving special knowledge that will improve a man's work and be of assistance to him in obtaining and satisfactorily filling the higher position of shift boss, foreman, etc., in the mines and mills of the State. With the idea that the most convenient time for holding these courses would be during the winter, the session will begin Jan. 9, 1911, and continuing for eight weeks, will terminate March 4. There are no entrance requirements nor examinations, and while there are no age limits, the work is laid out for mature students who want to make the most of the time they spend at the university. The only cost will be for railway fare and for living expenses, as there are no charges for tuition nor laboratory fees. Supplementing the special work lectures of general interest will be given during the short session on subjects of real present importance, which will be treated in a nontechnical way and help to make attendance at the short courses of great benefit.

Editorial Correspondence

Reports from our own Representatives on Important Events from Many Important Mining Centers of the World

Denver

Jan. 6—A report from Leadville states that in the Helena, in Iowa gulch, and the Dunkin, on Fryer hill, the caving of ground has revealed orebodies during the last two months; and in the latter property the leasers, E. Brady and associates, had a Christmas box presented to them in the same manner. The property has been idle for years, and the shaft and all the workings are in bad condition. These will now be all put in shape, and shipments made from this new discovery.

One of the outcomes of the long-drawn-out strike in the northern Colorado coalfields was the sentencing by District Judge Whitford of 16 union miners to a year in the county jail. For this Judge Whitford has been in the receipt of threatening letters couched in the foulest language, which, however, he declares will not intimidate him, or deter him from doing what is clearly his duty. It was proved that these men had beaten up three nonunion miners, and it was also stated that evidence showed they had made preparations to roll dynamite down the shaft of one of the mines. This was in clear violation of the injunction granted, Nov. 29, by Judge Whitford to the Northern Coal and Coke Company. This occurred in the mining town of Lafayette, the town marshal of which, being in sympathy with the strikers, refused to carry out the provisions of the injunction and made no effort to quell the attack on the nonunion miners, though it occurred in the public street in the early morning. This marshal was on trial for contempt this week, but was not punished by the judge, who continued his trial to Jan. 30, and dwelt with him leniently, intimating that his punishment would largely depend on how he conducts matters at Lafayette in the interim.

Work is progressing in the tunnel of the Mineral Hill Railway and Tunnel Company at Cripple Creek. This project is being financed by a local pool of business men. Mineral hill has been but superficially prospected and developed in the past though numerous small finds indicative of rich deposits have been made. Placer deposits at the foot of the hill have been worked with profit and an occasional nugget of value has been picked up from the surface. Some years ago a pocket of lead ore was found on the Spring Creek side of the hill, though after a desultory prospecting the owners gave up hope of finding anything of value. Seven years ago the district underwent a boom and a quantity of rich sylvanite ore was found, the best coming from a small pocket on the Laura Lee on the north slope of the hill. It is the belief that in depth and with sufficient development more ore is to be found in this property. The formation on the southernmost part of the hill is volcanic and appearances are that the hill is located on a crater. If this prove true the ore occurrences might be found to parallel those of Battle mountain as proved in the Annie Lee and Portland.

The results shown by the wet-milling cyanide process as in operation at the Portland and Independence mills are manifest that the treatment of Cripple Creek ores is bound to be revolutionized. The true significance of the success of the above methods is brought to mind when we consider that it is claimed that ore running as low as $2.80 per ton can be treated at a profit while the lowest treatment charge at the custom plants is about $4. There is an enormous tonnage of low-grade ore in the district which will thus be placed available to market.

The Alma district, Park county, one of the prominent early-day producers, has recently been undergoing a boom due to the installation of the 240-ton copper-matte smeltery which was blown in by the Colorado Gold Mining and Smelting Company, in July. The plant, which is constructed to handle the low-grade ores of the camp, is operated primarily on company account working over the ores from six mines which the company controls, accepting whatever of custom trade the district may offer. A fair record has been maintained since the starting of operations insofar as the smeltery is concerned. The great drawback has been the lack of facilities for quick transportation of heavy tonnage of ore. All ore must be transported in teams and the company's mines are for the most part hard of access. Another source of ore supply has been cut off by the recent closing of the Leadville branch of the Colorado & Southern railway, thus stopping a moderate production from the camp of Kokomo. Money is being raised this winter to finance the erection of a district tram and thus obviate the unsatisfactory condition in the camp. However, the mining of low-grade ores is being actively engaged in and the camp is the recipient of more interest and energetic work than has been its lot for a number of years.

Salt Lake City

Jan. 5—At a stockholders' meeting of the Uintah Treasure Hill, Dec. 29, 600,000 shares out of the 1,000,000 capitalization were voted to ratify the action of the board of directors, by which a settlement of the suit against the Silver King Coalition was made, and the company's Park City properties sold to the latter, the consideration being $100,000 in two promissory notes, each bearing 6 per cent. interest, and due July 1, 1911, and Jan. 1, 1912, respectively. The stockholders were also asked to make and deliver deeds for the conveyance of the property to the Silver King Coalition. This closes the transaction, and the transfer of the deeds will place the Silver King in possession.

The United States assay office, at Salt Lake City, during the past year, purchased 48,791 oz. gold, valued at $907,749, and 18,161 oz. silver, valued at $8556, making a total of $916,305. In view of the conditions in gold mining throughout the State in 1910, the business done during the year is considered good. November and December were the best months, there having been received in December about $200,000 worth of bullion.

During 1910 the Salt Lake Stock and Mining Exchange traded in 17,129,850 shares of stock, the market value of which was $4,842,396. Less than half the number of shares sold in 1909 were sold in 1910, and the value of the shares transferred was a little more than one-fourth of the value of the transfers in 1909.

The Daly West, which began leasing in its upper levels several months ago, has given notice to leasers that future settlements will be made on a different basis than formerly, the terms to be decided by the company. Heretofore settlements have been made on a 33.3 per cent. royalty, and during the short time the leasers have been at work the company has received about $14,000 in royalties. It is understood that the leasers are willing to have the royalty increased to a 50 per cent. basis, but that the company will probably decide on a plan similar to that in use at the Daly-Judge, which allows the leasers to make double their ordinary wages, or about $6 a day.

Proclamations ordering additions and eliminations to national forests in Utah, Idaho and California were signed by President Taft, Dec. 27. The Sevier forest, in Utah, had 93,730 acres eliminated and 2560 acres added. Land in Emery county along the Price river, amounting to 8620 acres, has been restored to entry by order of the President.

Butte

Jan. 6—At a special meeting of stockholders of the Boston & Montana Consolidated Copper and Silver Mining Company held in Butte, Dec. 27, the stockholders passed a resolution authorizing the board of directors to bring proceedings for the dissolution of the corporation. This is the first of the old Amalgamated operating companies to go out of existence and similar steps will doubtless be taken by the Butte & Boston, Trenton, Red Metals and Washoe companies. The shares of Anaconda stock which these former operating companies received in exchange for their mining property will be divided up among the shareholders of the old operating companies.

A representative of certain Pittsburg interests has recently been investigating the feasibility of constructing an electric road from Anaconda through the Georgetown mining district. This would connect a rich mineral district with the smeltery at Anaconda. The mining industry in the Flint Creek district is active at present. The Southern Cross mill is employing an increased force and many of the mines are shipping to the Anaconda smeltery. Robert Lindborg has recently shipped a carload of ore to the smeltery on which the returns were $27.40 per ton. At the Trilby mine the drift is expected to cut the lode shortly.

Spokane, Wash.

Jan. 5—It is predicted that an important miners' rush will follow the passage of a bill at this session of Congress, opening to entry the mineral lands of the Spokane Indian reservation, northeast of Spokane. United States Senator Wesley L. Jones, of Washington, who introduced the bill, has advised the Spokane Chamber of Commerce, that its adoption seems assured. More than 25 syndicates have been formed in Spokane in anticipation of the passage of the bill. Deposits of silver, copper and tungsten have been traced across the boundaries of the reserve, part of which was opened to homesteaders last spring, and at one time development was under way on 70 claims, when the prospectors were ejected by agents of the Government. Senator Jones' bill provides that "from and after the passage of this act any lands of the Spokane Indian reservation, classified and reserved as timber lands under any act of Congress heretofore passed, shall be open to exploration, location, occupation and purchase under the mining laws of the United States."

Indianapolis

Jan. 7—With the convening of the Indiana legislature Jan. 5, the drafting of bills relating to mining goes on briskly. Among the measures ready for introduction the first week of the session are: A bill to provide for a weekly cash payment of employees of mines, prohibiting payment by check or otherwise, and providing for a penalty of $1 a day for nonpayment; for a compensation and labor pension act, providing for a tax of 1 per cent. on the output of Indiana coal mines; a law requiring operators to pay the shotfirers; a law requiring miners to pass examination by a board of examiners before entering a mine; a mine safety law, providing for escapes from coal mines, and a bill legalizing labor unions and the practice of picketing mines.

The operators are undecided as to whether to fight the miners' measures on the floor of the legislature or permit them to go on the statute books and fight them in the courts.

Birmingham, Ala.

Jan. 7—Joseph Hoadley, of New York, president of the Alabama Consolidated Coal and Iron Company, was in the Birmingham district for nearly two weeks, during which time he made a thorough inspection of the properties of the company. He announces that during the year there will be a number of improvements about the properties and that some extensions will also be made.

The purchase of the big tract of coal lands in Walker county; the purchase of a large acreage of ore lands in Tennessee, across the Alabama line; the purchase of the blast furnace at Cedartown, Ga., and properties adjacent to that plant by G. B. McCormack and Erskine Ramsay, of Birmingham, have given rise to rumors that another big corporation will soon make its appearance in the South.

Cobalt

Jan. 6—The prospectors in Porcupine are organizing a movement to apply to the government for an extension of the time for the doing of assessment work. Under the present laws, the first 30 days' work must be done within 90 days from the date of staking and this makes it a considerable hardship for those who staked at or after the beginning of winter. In addition to this the work is practically valueless, and the difficulty of getting in supplies through the deep snow into the outlying districts is enormous. Last winter a special act was passed extending the time six months, from the first of January till the end of June, and the department will be asked to put this into force again.

Returns now show that shipments from Cobalt for 1910 exceeded those of 1909 by 4084 tons, this establishing a new record. In addition to this about three-quarters of a million ounces in the form of bullion was sent out.

Since the opening up of the winter roads, there has been a marked increase in the activity of the Gowganda district and there are now approximately 60 teams on the road handling freight and supplies. The Millerett is bringing in a larger compressor and the machinery for its concentrator will also arrive shortly. The new four-stamp mill at the Reeves-Dobie is running and is treating approximately 20 tons of ore per day. A fire destroyed some of the buildings of the Bartlett, but the machinery was uninjured, and the work will not be interfered with to any extent. Some good ore is being raised from this property and a high-grade shipment will be made. The main development in the district, however, has been at the Miller Lake-O'Brien, and this property promises to become an important producer.

Mexico City

Jan. 2—The Magistral Ameca Copper Company, operating in the Magistral district, Ameca, Jalisco, began milling in May of 1910, in its 150-ton mill installed by the Denver Engineering Company. The original plant consisted of crusher, roughing spring rolls and two rigid rolls, sizing trommels, Richard's jigs—the product of the jigs being reground in a tube mill and treated in the Elmore machine. The jigs and Elmore machine gave poor results and were discarded in September and replaced by tables and jigs of different make. The present tables are three Wilfley sand tables, one Dunham and two Wilfley slimers, all of which are giving satisfaction. A saving of 75 per cent. is being made. The ratio of concentration is six to one. The ores assay from 3 to 5 per cent. copper with a little silver and gold. The copper occurs as chalcopyrite in a gangue of silicious rock. Concentrates are shipped to the Aguascalientes smeltery.

The company is a Los Angeles concern which has organized a Mexican operating company. Local Mexican and French capital to considerable extent has entered the company. H. L. Percy is president of the operating company and James Harvey and Miguel Taboada are directors. The manager is James Harvey and P. A. Babb is consulting engineer.

The Ocotes property has been prospected during 1910 by American and Guadalajara capital, and milling and shipping ore was encountered in November. The Zapote property is under option to Los Angeles capitalists; the Las Moras property is being examined by engineers representing Arizona copper interests.

The Mining News

Reports of New Enterprises. New Machinery. Installations. Development Work and Property Transfers. The Current History of Mining

Alaska

Spokane capitalists, represented by William Springer, have acquired the S. W. Wible placer claims on Cañon creek, near Seward, and development work will be started as soon as possible.

Considerable attention is being drawn to the Landlock district, on Prince William sound, between Cordova and Valdez, where about 12 different companies are working copper prospects.

Kenai-Alaska—This company has been oragnized by James Hayden and others of Seward, to mine and develop certain property on Falls creek. Development work has been conducted on an extensive scale, and will be continued through the winter, and new machinery will be installed early in the spring.

Hemple—It is claimed that on this property, near Valdez, owned bv S. A. Hemple, there are 200,000 tons of ore blocked out, which will average about 8 per cent. in copper and $1.25 in gold. This property is being worked steadily.

Mexican—Electric motors are being installed at this mine on Douglas island. These motors will be used for running the rock crushers when water power is scarce. At present the 300-stamp mill is shut down on account of the scarcity of water.

Arizona

Gila County

Miami—It is improbable that the new concentrator will start operations before February. In the underground workings new timbers have been put in the main drifts, track laid and electricians are installing trolley wire on the 420-ft. level. Chutes from the ore "room" on the 370-ft. level to the ore bins on the 420-ft. level where the main haulage system of the mine is installed, have been completed. Two raises have been put up from the 420-ft. level to the dump at the No. 4 shaft. By mixing the ore in this dump with a sufficient amount of higher grade, it is probable that practically the entire dump will be worked at a probable profit. The three churn drills, working in the northwestern part of the property have completed to date 32 drill holes, reaching an average depth of 600 ft. The drills are making about 35 ft. per 12-hour shift.

Orphan—General Manager C. M. Clark has purchased a churn drill and preparations are being made to explore the company's claims, which lie west of and adjoining the Miami townsite and contiguous to the ground of the Inspiration and Live Oak companies. From the eastern end of the claims, an incline shaft has been sunk 500 ft. and about 600 ft. of crosscuttings completed. Some ore of good grade is claimed to have been found. The annual assessment work is about finished.

Boston-Miami—Camp has been moved to the northern end of the property on the Montezuma group. It is expected that two churn drills will be started in a few days.

Superior & Boston—Development on the eighth level in a drift paralleling the Great Eastern vein has resulted in a favorable showing. A vein 6 to 8 in. wide that shows indications of a larger orebody, has been followed for over two weeks. The point at which the ore is being encountered is almost directly beneath the place where the high-grade ore was found on the level above.

Inspiration—The Joe Bush shaft has attained a depth of 490 ft. and the Colorado shaft a depth of 475 ft. Ore was encountered in the last few feet in the latter. These shafts and the Scorpion have been connected on the last level. Most development work has been done in the vicinity of the Bush shaft. A 75-ton test-mill run has been made. Six drills, four blocking out ore and two prospecting, are now at work on the property. In drill hole No. 405 ore was found assaying as high as 4 per cent. copper.

Old Dominion—The cost of producing copper in November is stated to have been 8.28c. per lb. This is a marked reduction, the year's figure being stated as close to 10⅜c. per lb. and that for the last six months, 9¼ c. It is reported that the custom-smelting business of the company, amounting to about 10,000,000 lb. out of a total of 28,019,000 lb. for the year 1910, has not been profitable to the company, and that contracts will not be renewed except on terms more favorable to the Old Dominion.

Barney—The churn drill has reached a depth of 240 ft. Work is being carried on under the direction of Mayor J. D. Copelin, of Globe, president of the company.

Arizona-Michigan—Supt. N. Nelson is now on the claims attending to the annual assessment work. An extension has been granted on the option till July 1.

Live Oak Development—At a special meeting of the directors held at Duluth, Minn., Dec. 29, it was decided advisable to increase the capital stock from 50,000 shares of a par value of $10 each to 100,000 shares of like value. The matter will be decided at a special meeting of stockholders to be held at Bakerville, Cochise county, Ariz., Jan. 24. The company was organized under the laws of the Territory of Arizona, Jan. 21, 1909. To Dec. 31, 1910, receipts totaled $391,501 and disbursements $302,281, leaving a balance of $89,219. Future payments to be made on the property before Dec. 3, 1912, amount to $387,800. Drilling is estimated to have developed 6,000,000 tons, average copper assay 2.25 per cent., and partially developed 3,000,000 tons of like grade. Development has cost 3.52c. per ton, exclusive of payment of $90,800 on property. Manager McCarthy is making plans for the exploitation of the orebodies. Five of the six drills operating on this property are reported to be working in chalcocite ore of commercial grade. Churn-drill hole No. 36, near the boundary of the Montezuma group in the western part of the property, is making slow progress owing to the formation being badly broken and full of boulders.

Warrior—This company has been shipping about 100 tons of ore daily to the Old Dominion smeltery at Globe. This year shipments will be made to the El Paso smeltery of the American Smelting and Refining Company. Developments in block 40 on the west end of the Warrior holdings are reported to be quite favorable.

Lost Gulch United—J. D. Harrington, formerly in charge of the work on this property, has taken over the holdings of the company. Development will be instituted.

Arizona-Colorado Copper—General Manager John F. Shaw is in charge of work on this property, where about 20 men are being employed in development.

Graham County

Arizona Copper—It is reported that bids are being received for the enlargement of one of the concentrators from a daily capacity of 800 tons to one of 1500 tons.

Yavapai County

Consolidated Arizona—An additional roaster is being added to the equipment at the smeltery, the present roasting capacity being 150 tons per day and that

of the reverberatory 220 tons. Sinking has been started below the sixth level, on which an almost continuous orebody both north and south of the dike is stated to have been developed. The ore is said to average 5 per cent. copper and $2 in gold and silver over a width of 18 ft. A six-day shutdown of the reverberatory furnace in the early part of December curtailed the smeltery output to nine cars of bullion for the month.

YUMA COUNTY

Consolidated Copper Mine—On this property, comprising 140 claims, about 3000 ft. of shaft and tunnel work is reported to have been done, and the claims surveyed for patent. The greatest amount of development work has been done on the Revenue group. Frank Robbins is general manager and S. F. Parrish general superintendent. The property lies in the Cieniega district.

California

SHASTA COUNTY

First National Copper—The Balakalala smeltery is reported to have resumed operations on Dec. 29. It is also reported that the directors of the company have withdrawn the offer to exchange First National shares for those of the Aztec Petroleum Company.

SIERRA COUNTY

Bert Dondero has uncovered a vein 6 ft. wide showing much gold on his claim near Sierra City. Alleghany has been provided with electric lights and power.

Standard—The rich vein in this mine in Sailor ravine has again been encountered. Frye & Blevins owners, expect to erect a five-stamp mill.

Bessler—This property on the Serpentine, just north of the town of Downieville, has been bonded to Messrs. Frye and Blevins.

Red Star—High-grade ore has been encountered in the mine near Alleghany.

Bellevue—Forty to fifty men are at work at this mine in northern Sierra county.

Sacred Mound—The rich ore recently discovered in this mine near Sierra City will be treated in the Saddle Butte mill to which a tramway is being constructed from the mine.

Alaska—This mine at Pike City is putting on a full force of miners. For some time nothing but prospecting and pumping has been done here.

Twenty One—A ledge rich in free gold has just been uncovered in this property near Alleghany. F. M. Phelps is manager.

Sovereign—The Nevada vein in this property in Ladies cañon was cut last week. The tunnel is in over 650 ft., leaving over 300 ft. of backs. F. O. Richardson, Downieville, is manager.

Monte Cristo—Rich gravel has been opened up in this mine near Downieville in the old Belcher channel which was cut a few days ago. Mr. Phelps of the Twenty One at Alleghany is manager.

Colorado

CHAFFEE COUNTY

Monarch-Madonna—Kenneth E. Burton, general manager, reports that receipts from ore sales and royalties in November totaled $13,034, disbursements $8087, leaving a cash balance of $4947. Forty carloads were shipped from the sixth level during the month.

CLEAR CREEK AND GILPIN COUNTIES

Aetna—An encouraging strike is reported from the lease of Convery & Co., which is working through the Capital tunnel. A recent mill run of 11 tons gave 8½ oz. gold and 35 oz. silver per ton.

Topeka—A 250-ton concentrating plant is being built for this mine and will be in operation the first part of the year. The main shaft is down 1300 ft. and will be driven 200 ft. deeper. The principal orebody is said to be 5 ft. wide and to assay well throughout its exposed length and width.

Aduddel and Frontenac—These properties are proving valuable with systematic development under direction of H. P. Lowe. Ore will be shipped to the Topeka mill when it is ready to receive ore.

Champion Trio—Some good ore is being mined from the 800 level of this property, which has in the past been a heavy producer.

LAKE COUNTY—LEADVILLE

The mining of zinc carbonate does not constitute the entire mining activity of Leadville. That other ores are receiving their usual attention is attested by the extensive development work which is going on in several properties with gratifying results.

Nevada—The character of the ore in this Breece Hill mine is said to have changed to an oxidized gold ore, with an average value of 2 oz. gold per ton, with some silver.

Helena—The Helena shaft, Iowa gulch, has been unwatered to the 500 level, and the workings will at once be cleaned out and retimbered.

Sugar Loaf Consolidated—The breast of this company's tunnel is now in 2500 ft. and in a few hundred feet more will reach the end line of the Dinero vein. At this point, it is stated, the tunnel will unwater five shafts that have produced an aggregate of $300,000 at a depth of not over 200 feet.

Ibex—The Colfield lease in the No. 2 shaft recently opened a high-grade streak of ore.

PARK COUNTY

London—It is reported that J. M. Kuhn has secured an extension of the lease in New York, and will start a tunnel toward the head of South Mosquito gulch, and run a crosscut, which will cut the vein 600 ft. deeper than the present workings. The vein will then be developed its entire length on London mountain, and the north and south workings connected.

SAN JUAN AND OURAY COUNTIES

In the Joker tunnel, Red Mountain district, Ouray county, lessees are working a large force, and making shipments. The Mono-Baltic mine and smeltery, at Ironton, has increased its force, and it looks now as though the old Saratoga smeltery will certainly "blow in" when spring arrives. The Barstow gold mine is being developed, and will be a shipper this year. The Yankee Girl lessees are developing and working in good ore.

Tomboy—Returns for December are as follows: Mill ran 29 days; crushed 10,500 tons yielding $28,000; concentrates shipped, $40,500; expenses, $43,500, leaving a profit of $25,000.

TELLER COUNTY

Rexall—Arrangements have been made with the Granite company, owning the Gold Coin shaft, to hoist ore and waste rock because of the small space for dump ground which it owns on South Second street. An aërial tram will be constructed to carry the waste rock to South Victor.

Rattler—Deep development for this Raven hill property has been guaranteed through the lease recently issued the Blue Flag Gold Mining and Milling Company, owning the Blue Flag mine adjoining. Under the lease conditions the Rattler and Bertha M. claims are to be exploited through the deep workings of the Blue Flag, where the company is at present engaged in sinking the main shaft.

Idaho

COEUR D'ALENE DISTRICT

Wallace Development—Operations have been resumed in this lead-silver mine.

Tam o' Shanter—Eighteen inches of shipping galena is showing in the face of the drift. Ore has been followed for 300 feet.

Monarch—The 200-ton mill is expected to start this month and will be run to its capacity, turning out 600 tons of lead-silver concentrates monthly.

Mineral Ridge—A 6-ft. ledge carrying 12 in. of ore rich in silver is reported to have been cut at 70 ft. depth.

Alhambra—An important strike is the opening of 8 ft. of ore, 2 ft. of which is of shipping galena, in the long crosscut. The Alhambra is said to have the east extension of the Bunker Hill lode. John A. Finch, of Spokane, controls the company.

Indiana

Clay County

Mining business in the block coalfield of this county has practically come to a stop; only a few companies have orders on their books to be filled. A few days ago the jobbers of Chicago were clamoring for coal, but now the yards there are full and there is slight demand.

Sullivan County

The Shirley Hill Coal Company has filed a petition for an injunction against County Treasurer Edward Ward, to prevent him from forcing the collection of taxes on alleged omitted property. The complaint attacks the validity of the law providing for the taxing of unmined coal.

The mine-rescue car of the United States Bureau of Mines arrived at Sullivan, Jan. 4, for a free demonstration and lectures. Arrangements were made to close the mines for one day so that the miners could attend.

Vigo County

Zeller Coal Mining Company—This company, at Brazil, has begun sinking a shaft on the Vandalia Railroad Company's land in West Terre Haute. The company is proposing to open and operate an uptodate mine.

Michigan

Copper

Hancock—Stoping has been started on the 13th, 14th, 15th and 16th levels tributary to the No. 1 shaft, preparatory to the beginning of rock shipments to the stamp mill. The high-duty power equipment is about ready for regular service and an order has been placed for an electrical-haulage system to handle rock from the No. 1 to the No. 2 shaft on the 13th and 18th levels, where loading stations will be installed.

Mohawk—The 1910 production was 11,390,000 lb. of copper; the approximate cost of production 11c. per lb. The ore yielded approximately 14.25 lb. copper per ton, as against 13.73 lb. in 1909.

Wolverine—It is claimed that the 1910 production of 9,610,000 lb. cost only about 7½c. per lb. On the 28th level from the No. 4 shaft crosscutting is being done into the foot-wall of the Kearsarge lode. The new Osceola shaft is being sunk to develop the Osceola amygdaloid.

Lake—Announcement has been made by the management that a new shaft will be sunk, owing to the long distance that is required to crosscut from the present shaft to the lode. It is likely that active work will be started at this point as soon as the new compressor goes into commission.

New Baltic—This company has started its first crosscut to open the lode at the 200-ft. level.

Iron-Marquette Range

Kloman—At this mine, adjoining the Republic, work has been begun on a shaft, which is to develop the tract of 600 acres. It is owned by John T. Jones, of Iron Mountain.

Iron-Menominee Range

The Menominee range shipments of Corrigan, McKinney & Co., who operate principally in the Crystal Falls district, were 630,000 tons. The old Bird mine at Crystal Falls, the fee of which is owned by the county of Houghton, Mich., has been taken under option by Joseph Croze, of Houghton, and will be given another test. R. Skiff Sheldon, of Houghton, has just abandoned an option on the property.

Minnesota

Iron-Mesabi Range

A new mining district, the development of which is now being started, is the country in the vicinity of Grand Rapids, at the western extremity of the Mesabi. The Hanna interests of Cleveland, O., are preparing to open a mine on the property of J. W. Poole, close to the shore of Pokegama lake. Drilling had revealed the existence of a large body of ore, and to test the ground a small shaft was sunk to a depth of about 40 ft., a point 15 ft. below the level of the water. It was found that there was little or no seepage from the lake and it is now announced that a mining shaft of regulation size and character will be put down and the ore deposit will be opened. The property has been named the Poole. The prospective mine is three miles southwest of Grand Rapids. A number of other tracts in the vicinity have been leased.

Montana

Butte District

Butte Coalition—Notwithstanding the excellent reports that miners bring from the Minnie Healey and Tramway mines, the Anaconda company is conserving the Coalition orebodies, and at present the output is lower than it has been in several years, with the result that the production is only about 1.7 tons per man.

Raven—The company has filed its petition for dissolution in the local district court. The petition alleges that 615,648 out of a total of 630,000 shares were voted for the dissolution and that all debts have been paid. A new company, recently incorporated, has taken over all the property of the old one.

Butte & Superior—It is probable that the development work by the company on the Butte & Milwaukee Company's ground will be resumed early in the year. Work on the crosscut from the Black Rock shaft to the Butte & Milwaukee's Colonel Sellers shaft was begun last year, but was not completed.

Alex Scott—On the 500-ft. level the south crosscut has intersected a vein 28 ft. wide, containing three seams of ore, one 2 ft. wide carrying high-grade ore. The face is reported to average 4 per cent. copper. On the 600-ft. level 300 ft. of drifting has been done, but no commercial ore encountered. On the 1000-ft. level a 6-ft. vein of concentrating ore has been disclosed, while on the 1200 a 4-ft. vein of first-class ore is being mined. It is expected that between 100 and 200 tons daily will be shipped to the East Butte company's smeltery.

Beaverhead County

Copper Queen—A new pump, hoist and other machinery are now being shipped to the mine and it is planned to add a concentrator in the spring. The shaft, now down 500 ft., will be sunk deeper. A good body of ore has been blocked out from the 100-ft. level to the surface. Twenty-two men are employed under the direction of G. H. Lynch, manager.

Lewis and Clark County

American Smelting and Refining Company—An explosion of matte caused a fire in the plant, resulting in $5000 worth of damage and the closing of the blast furnaces for several days.

Magpie Development—The last of the machinery for the new dredge has arrived on the ground and is being rapidly put together. The dredge will begin on the edge of Lake Sewall and will work toward the ground upon which it expects to operate.

Nevada

Esmeralda County

Diamondfield-Daisy—This company's stock has been admitted to quotation on the New York curb.

Lyon County

Mason Valley—Developments in the southeastern section of the mine, on the third level, are said to be promising. Connection has been made between the east crosscut and south drift on this level and a station cut in the winze below the fourth level.

Nye County

Ore shipments from Tonopah for the week ending Dec. 31 were: Tonopah Mining, 3550 tons; Belmont, 1450 tons; Montana-Tonopah, 1056 tons; MacNamara, 200 tons; West End, 300 tons; Tonopah Extension, 880 tons; total shipments, 7436 tons, estimated value being $185,900.

For 1910 ore shipments from Tonopah totaled 362,893 tons, estimated value $25 per ton. Total gold, $2,721,696; silver, $6,350,629.

West End—The west drift from the south crosscut, about 850 ft. from the shaft, is now in about 150 ft. on a vein averaging 3 ft. in width.

Tonopah Mining—Advances in crosscutting and drifting in the Mizpah, Red Plume and Silver Top for the week ended Dec. 31 totaled 415 ft. On the 700 level in the Red Plume, under the footwall of the main Red Plume vein, a large orebody is being opened.

Tonopah-Belmont—The new Belmont shaft is being used for the hoisting of ore. The connection between this shaft and the workings has been made on certain levels, with the result that ventilation has been greatly improved. Ore is being extracted from the 900-, 1000-, 1100- and 1166-ft. levels.

Round Mountain—In the "sheeted" zone, which is being developed by the new or No. 2 shaft, rock of good grade is being broken by open-cut methods. Neither this nor the No. 1 shaft section, which comprises another large orebody, is affected in any way by the litigation now pending against the company, according to Director Lewis D. Gordon.

WHITE PINE COUNTY

Giroux—The 10th level on the Alpha orebody is stated to have been connected with the big five-compartment shaft. Pending the installation of the pipe lines from the steam plant to the pumps at the 1200-ft. station in the Giroux shaft, work has been discontinued in the crosscut from the 1200-ft. level toward the Alpha workings. This crosscut is in about 3500 feet.

Boston & Ely—E. W. Ralph, manager, is hastening work in the Emma shaft.

New Mexico

GRANT COUNTY

Chino—Three large steam shovels are at work removing capping from the orebodies and one small one is grading for the machine shop. The large force of men have completed the foundation and are erecting the steel structure of the concentrator at Hurley. Ore reserves, as of Dec. 1, were estimated at 31,756,700 tons assaying 2.59 per cent. copper. Drilling is being prosecuted in the outlying boundaries of the Carrasco section.

Oregon

BAKER COUNTY

Hoosier—Development under C. H. Ames, of Sumpter, will be done through the winter.

Rainbow—An option has been given to the United States Smelting, Refining and Mining Company, which has four months in which to examine the property and decide as to taking the bond. The Rainbow is a gold mine belonging to the Commercial Mining Company, of Portland.

JOSEPHINE COUNTY

Oriole—Cyanide equipment, steam-power compressor, machine drills and steam hoist will be installed. O. S. Blanchard, Grants Pass, is manager. Fayette Jones and J. C. Mattison, Grants Pass, control the property.

Segne-Tomek—New machinery will be installed on this property; F. Tomek, manager, Grants Pass.

Robert Dean—This placer property in the Galice district has been sold to Dillon & Bedford, of Los Angeles, who will equip it with machinery.

Pennsylvania

ANTHRACITE COAL

Philadelphia & Reading Coal and Iron Company—The financial statement for the five months of the fiscal year from July 1 to Nov. 30 shows gross earnings of $12,553,008; expenses, $12,626,896; deficits, $73,808. The gross earnings were $507,216 more than in 1909; the deficit compares with net earnings of $272,355 last year.

Utah

IRON COUNTY

Big Fourteen Leasing—Articles of incorporation have been filed. There are 100,000 shares at 25c. each. The company is interested in the Correy, Sunflower, Buckeye and Bonanza claims in the Stateline district. Robert Weiss is president.

Gold Springs Mining and Power—A contract has been let to A. E. Short to run a drift from the 300-ft. level of the Jennie mine to the Talisman vein, a distance of about 360 ft. The vein outcrops for about 1000 ft., and where prospected, carried around $7 to the ton in gold and silver. The country rock is andesite.

JUAB COUNTY

Tintic shipments for the week ended Dec. 30 amounted to 84 cars, the small output being due to the reduced forces at most of the mines during the holidays.

Iron Blossom—The American Smelting and Refining Company treat 150 tons of silicious gold and silver ores daily, and about 30 tons are being shipped to the International. The strike made recently on the 500-ft. level of the No. 3 workings has been opened 37 ft. in width, and is said to run $6 to $7 gold, and 35 oz. silver. The drift on the 1700 level of the No. 1 shaft has been continued northeast, and has cut a second fissure.

Opohongo—On the level 150 ft. below the 300 of the Gold Chain, the orebody has been opened 75 ft. on its strike, and 30 ft. in width. It is stated to be of shipping grade. Drifting on the east-west fissure is being done via the 1000-ft. level of the Black Jack.

Lower Mammoth—Two cars of ore have been shipped from the new strike on the 200-level, which is between 400 and 500 ft. below the surface, and the ore-break encountered on this level has been found on the 300.

Sioux Consolidated—At the annual meeting Jan. 3, no change was made in the board of directors. During 1910 25,916 tons of ore was marketed, bringing $320,197. On Jan. 1, 1910, there was $8105 on hand. General expenses were $42,950; taxes, $12,817; wages, $75,219; freight, $25,458; dividends, $89,446; leaving cash on hand Jan. 1, 1911, $82,410.

Centennial-Eureka—The pumps on the 2250 level are running steadily, and raising a large amount of water, which is apparently draining some of the adjoining territory. In the Opex shaft the water is reported to be receding.

PIUTE COUNTY

Bully Boy & Webster—The company refused to extend the lease, and Mr. DeWitt is working the Roosevelt, formerly called the Deseret.

Wedge—Control of this property has recently changed hands. E. P. Mowers is president and general manager. Some rich gold ore has been produced in the past and development will be resumed.

SALT LAKE COUNTY

Bingham Mines—About 50 tons of lead ore and 25 tons of copper ore are being shipped daily. The former carries from 16 to 40 per cent. lead, while the latter runs as high as 8 per cent. copper. At the Yosemite, adjoining the Dalton & Lark, drifting is being done from the shaft at various levels. The tunnel at the Commercial is being driven.

Niagara Mining and Smelting—Suit was filed Dec. 29 by the Union Trust Company, of Pennsylvania, in the local court. The complaint is based on an issue of bonds made in May, 1895. These were secured by a mortgage on about 50 of the company's claims in Bingham. According to the complaint no interest has been paid since Nov., 1900; the principal became due in May, 1905. A foreclosure was asked.

Silver Shield—Arrangements have been made with the United States company, at Midvale, for shipping low-grade lead and zinc ores. An initial lot of 350 tons will be shipped, and 30 tons daily thereafter.

Columbus Consolidated—The pumps are holding the water at the 200-ft. level.

Utah Apex—Active development is being done on the Parvenue tunnel and No. 7 levels. The silver-lead orebody on the tunnel level is opening up well. The Bingham-Mary has brought suit for alleged trespass, and applied for an order of survey, which has been granted by the management of the Apex without an order of the court.

SEVIER COUNTY

Gold Mountain Consolidated—The sale of the Annie Laurie claims, owned by this company, was called off, to await further instruction from the court, as no bid was received. The real and personal property of the company, consisting of three power plants, transmission lines, etc., were auctioned for $20,000, by O. M. Packard, who is understood to have represented the Sevier Valley Mining and Power Company.

TOOELE COUNTY

Ophir Hill—Work has recently been started on a 3000-ft. drain and haulage tunnel starting in the cañon near the mill. Little ore is being mined. Up to the present the mine has been worked through a 1900-ft. incline, which has necessitated pumping water 600 ft. It is figured that the new tunnel will cut the ore-bearing beds 150 ft. below the lowest workings, giving 300 ft. or more on the dip.

Hidden Treasure — Shipments have been made by G. W. Lynch, who has a lease on this property eight miles southeast of Stockton.

Kearsarge Silver Mining—This company, owning claims in Dry cañon, near Ophir, has filed articles of incorporation. The capitalization is $2,000,000 in $10 shares. The board of directors are Alexander W. Leisenring, Samuel D. Connor, W. W. Newcombe, John White and Frank Gulager.

Lion Hill Consolidated—E. A. Fordyce & Co., of Boston, have issued a report or prospectus of this company's property, at Ophir. The capitalization is 1,000,000 shares, par value $1. The property is a consolidation of five companies, the original owners received 556,735 shares, the balance 443,265 shares being held in trust for the benefit of the treasury. Fifty-thousand shares of this treasury stock has been offered to the public to provide working capital. W. B. Farmer is president, and E. A. Fordyce treasurer. Work is being done in the Buffalo tunnel and Chloride Point incline.

UTAH COUNTY

Heavy snowfalls have driven a good many miners out of American Fork cañon. The principal properties still working are the Mountain Dell, Pacific, Miller Flat and Dutchman. Leasers are reported to be at work on the old Miller property.

Mountain Dell—Development work is being carried on at this property. Supplies have been sent in for the winter.

Smuggler—Officers for the coming year have been elected. James Beck is president. The company owns a group of claims in American Fork cañon, on which a tunnel has been driven 160 ft. Work has been stopped.

Pacific—Shipments have been in progress for the past three weeks from the strike in the lower tunnel. From two to five teams are hauling. The vein has been followed 200 ft. on the strike, and sinking and raising on ore is in progress.

WASATCH COUNTY

While doing assessment work on ozokerite claims, at Colton, A. W. Clemons and associates, uncovered a vein measuring about 6 ft. from wall to wall. This is one of the largest veins which have been found in the ozokerite belt, and is said to average about 30 per cent. wax, with little rock or shale between the walls. A tunnel has been started at a lower elevation than the discovery, to cut the vein.

George E. Romney was appointed receiver for the Uintah Mineral Wax Company, Dec. 29, in connection with the suit of T. M. Monzingo against the company. Mr. Romney is a stockholder.

Washington

FERRY COUNTY

First Thought—It is proposed to equip this property with a milling plant in the near future. Patrick Burns, Orient, is owner.

Majestic—The tunnel on this property on Hungry Hill is in 50 ft. with a good showing of ore. E. P. Langer, Orient, is interested.

Little Giant—This property in the Orient district has been sold to George Foster and others of Spokane, and development work will be started.

Princess Republic—Operations on this property, formerly known as the Princess Maud, will be resumed under new management. The property is near Republic.

Morning Glory—The property of this company, the Morning Glory claim and a fraction adjoining it, has been bonded for two years to J. Leslie Bailor and J. T. Bailey, of Spokane, the payment being $25,000, according to reports. Cash payment of $1000 was made and a 25 per cent. royalty is to be paid on gross smelter returns. The mine is developed by a tunnel 400 ft. on the vein, from which a 300-ft. winze was sunk. The product is free-milling gold ore. The group lies a mile north of Republic, near the Mountain Lion mine. The principal stockholders in the company are E. J. Roberts, Eugene B. Hyde, Dr. C. E. Grove and E. L. Tate.

Chicamun—A compressor plant and other machinery will be purchased for this property, controlled by the Michigan Mining Company. Herman Camerer, Orient, is manager.

Trophy—Arrangements have been made to resume work on this property, in the Orient district. Alexander A. Anderson, Orient, is manager.

OKANOGAN COUNTY

Horn Silver—A 10-ton shipment of ore from this property near Oroville recently is reported to have netted $700.

SPOKANE COUNTY

Swastika—A compressor is to be installed on this property, near Spokane.

STEVENS COUNTY

Senator R. A. Hutchinson, T. H. Tollofson and H. Hubbell, of Spokane, have purchased the Diamond R., Blue Bucket and Bella May claims, near Metaline, and the concentrating plant at Metaline, which has never been operated.

North San Poil—A strike on this property developed ore assaying $100 per ton. The property has been idle for some years, but active operations are now being carried on by Samuel Kerr, of Republic.

Larson Lead—It is reported that a concentrator will be installed at once on this property at Metaline.

Last Chance—The erection of a concentrator is contemplated. A. Baker, Northport, is manager.

Dead Medicine—This property near Bossburg has been taken over by J. E. Pickrell, J. S. Haish, J. R. Brown and Charles Cox, who will develop it.

Blue Grouse—This company, W. A. Brockway, manager, Northport, is considering the erection of a mill to handle tungsten ores.

Juno and Echo—These claims near Chewelah have been bonded to Frank S. Ernest, of Spokane, and new machinery will be installed.

YAKIMA COUNTY

Northwest Coal—This property between Thorpe and Ellensburg, near the Milwaukee railroad, is to be actively developed in the near future. George S. Rankin, North Yakima, is president.

West Virginia

Four States Coal Mining Company—The final papers have been signed for the transfer to this company of several properties for which negotiations have been in progress for some time. The properties taken over by the Four States company are the Big Coal Company, with its Dorothy mine, one of the largest in the Cabin district, West Virginia, with a rating of 1800 tons a day by railroad; the Sarita mine, owned by J. H. Jones, with a capacity of 2000 tons a day, also 8500 acres of coal lands purchased by J. H. Jones from the Rowland Company and 6500 acres owned by the Annabel Coal and Coke Company, and originally purchased from Rembrandt Peale and the Western Maryland Railroad Company in 1909. Also a number of tracts of coal and surface lands, making a total of 23,000 acres.

Wisconsin

Ore shipments for the season from the Florence Iron Company's Florence mine were 208,000 tons, and those from Oglebay, Norton & Co.'s new Buckeye property 89,000 tons. These two are the only Menominee range mines in Wisconsin.

Zinc District

Vandeventer—This mine, near Cuba City, has been shut down, preparatory to a sale for about $275,000. As this company owns the fee, they do not have to pay the usual 10 per cent. royalty that is customary in the district.

Campbell Separating Company—The plant near Benton is to be enlarged; the company is buying low-grade concentrates to eliminate the pyrite.

Fox—This mine, near Hazel Green, is now doing the underground tramming with mules; the mill is producing about 20 tons of concentrates daily.

Calvert—A reserve pump that will be driven by electricity is being installed at this mine near Benton.

Wilkinson—The mine, near Benton, has been equipped with a small portable mill and the property is being carefully developed by the Vinegar Hill Mining Company, which also operates the Calvert and Vinegar Hill mines.

Little Minnie—A mill that formerly operated on the Meekers Grove property is being installed at this mine near Leadmine.

Klar-Piquett—This Platteville company is enlarging the plant. An offer of $150,000 for the property is under consideration.

Canada

British Columbia

Following are the returns of the output of the mines and smelteries of the Boundary district for the week ended Dec. 30 and for 1910 respectively: Granby, 19,539—1,101,924; Mother Lode, 8134—364,550; Jackpot, 420—16,145; Oro Denoro, 0—9339; Rawhide, 4000—47,350; Snowshoe, 1800—145,945; Number Seven, 0—1820; Sally, 0—32; Golden Eagle, 0—120; total, 33,893—1,687,316 tons. Smeltery tonnages were: Granby, 22,145—1,031,058; British Columbia Copper Company, 13,730—420,807.

Standard—Patrick Clark, of Spokane is reported to have acquired a 65 per cent. interest in this mine near Silverton, on a basis of $2,500,000 cash for the holding. The vendors are John A. Finch, of Spokane, and George H. Aylard, of Silverton; A. B. Campbell and Col. W. J. C. Wakefield, both of Spokane, are associated with Mr. Clark in the deal. Mr. Finch retains a 25 per cent. interest in the Standard Consolidated Mining Company which according to the report, will develop the property.

Ontario

The shipments from Cobalt for the week ended Dec. 30 were: Drummond, 325,000 lb.; McKinley-Darragh, 318,480; Nipissing, 285,100; Right of Way, 123,020; La Rose, 101,050; Buffalo, 60,800; Kerr Lake, 60,353; City of Cobalt, 60,000; Crown Reserve, 55,270; total, 1,389,073. (Shipments the previous week totaled 1,940,260 lb.). Bullion was also shipped as follows: Trethewey, 4316 oz.; O'Brien, 21,091; Nova Scotia, 54,431; Hudson Bay, 12,798; Crown Reserve, 31,636; Campbell & Deyell's sampler, 4792; total, 129,064 ounces.

Cobalt Central—The sale of properties has been postponed for 30 days to allow for the settlement of outstanding liabilities. It is possible that matters can be settled so that the mine may resume operations.

Lawson—A vein of high-grade ore averaging 8 in. in width has been opened for 50 ft. upon the 200-ft. level of No. 8 vein.

La Rose—Net profits for 1910 were $1,138,240.

Bartlett—The shaft is down 100 ft. and crosscutting has been started at the 35-ft. level of this Gowganda mine.

Boyd-Gordon—A crosscut is being run from the bottom of the shaft at 200 ft. to tap the vein. The property is at Gowganda.

Porcupine Exploration and Mines—This company, which recently took over the McPharland-Herlehy group of claims, has increased its holdings by purchasing on option three other locations in Deloro.

Tisdale—This company, which has taken over the properties of the Armstrong-McGibbon syndicate, comprising 17 claims in Tisdale township, has elected Frank C. Armstrong president; E. P. Earle, vice-president, and D. Lorne McGibbon and Samuel J. Dobie, directors.

Cordova—This gold property, in Belmont township, Peterboro, was recently purchased by a syndicate composed of P. Kirkegaard, of Deloro, William Hughes and Doctor Mackechnie.

Gilmour—Five more stamps have been added to the mill. The property is in Hastings county and the mine is being actively operated.

Mexico

Chihuahua

W. B. Brooks, representing W. P. Dunham, who controls a 90 per cent. interest, has denounced the following gold, silver and lead claims: Under the name of Beaumont, 52 mining claims; 45 under the name of Belmont; 56 under the name of Bonita; 36 under the name of Bolsa; one claim named Belvedere; 45 under the name of Beverly; 42 under the name of Butte. The claims are all in the Santa Eulalia district.

Oaxaca

Natividad (San José)—The mill is running full time. A new shaft has been sunk 100 ft. on the north end of the property along the old open cuts by the Spaniards and two stringers were cut which are mineralized. The management is said to be considering a thorough examination with a view of interesting outside capital.

Alianza—The control of this San José mine has been gained by the first owners. About 150 tons of hand-picked ore are stored on the patio.

Victoria-Tapada—Manager Joseph Brill reports that the mill at Totolapam has been completed. Besides the ore from the company's mines, custom ore from at least three neighboring mines will be treated.

Zavalete—The retreatment of the tailings dump by cyanide has been finished. There is considerable ore in the mine which could be extracted, but the development work will probably be further extended before another attempt at mining here at Gold Belt.

Sonora

Santa Teresa Mine—The claim that this famous *antigua* was found has not been substantiated.

North Tigre—The directors of this company and of the Fortuna Mining Company have authorized a bond issue of $250,000, to further prosecute development work and to erect a 100-ton concentrator and cyanide plant for joint use.

La Compañia Mina de Mexico—All the necessary parts for a 75-ton blast furnace are on the ground, and a 125-kw. generator has been installed. The properties are situated in the Sahuaripa district, and supervised by W. E. Pomeroy.

Palos Quemados—Development work has reached a depth of 500 ft. at this mine, near Alamos.

Greene-Cananea—One of the two 1850-k.v.a. generator units to the power plant has been received, the other being due this month. A compressor, to be electrically driven, is being placed at the Sierra de Cobre mine. The company has entered into a contract to treat the ores of the Mexican Metals Company's properties near Noria.

South America

Chile

Braden Copper—The No. 3½ Fortuna tunnel is stated to have been advanced 27 m. in ore assaying 3 per cent. copper. The No. 4 tunnel 420 ft. below the No. 3½, is being steadily advanced. The No. 1 tunnel at the Teniente mine has not encountered the main orebody. In December about 4400 tons were treated in the old mill. The first unit of the new concentrator is expected to begin operation in April.

The Markets

Coal Trade Review

New York, Jan. 11—Coal trade in the West is passing through the period of quiet which is not unusual at the opening of the year. There is very little to report, as the week has been almost without incident.

The seaboard bituminous trade has dropped into a dull period, and business has not been good. Anthracite trade, on the other hand, has been in good shape.

Coal Traffic Notes

Coal shipments of the 10 railroads in the Ohio Traffic Association, 10 months ended Oct. 31, were 13,022,254 short tons in 1909, and 17,330,664 in 1910; increase, 4,308,410 tons, or 33.1 per cent. Shipments by separate roads for October not reported.

Anthracite-coal shipments in December are reported at 6,231,578 long tons. This is an increase of 456,140 tons over December, 1909; and is the largest total ever reported in one month, with a single exception. For the 12 months ended Dec. 31, the shipments by companies were as follows, in long tons:

	1909.	1910.	Changes.
Reading	11,920,757	12,445,733	I. 524,976
Lehigh Valley	10,296,627	11,195,765	I. 899,138
N. J. Central	7,938,370	8,519,135	I. 580,765
Lackawanna	9,531,695	9,589,076	I. 57,381
Del. & Hudson	6,136,946	6,578,356	I. 441,410
Pennsylvania	5,966,543	6,250,976	I. 284,433
Erie	7,461,121	7,554,198	I. 93,077
N. Y., Ont. & West.	2,717,826	2,772,547	I. 54,721
Total	61,969,885	64,905,786	I. 2,935,901

The total increase was 4.7 per cent. All the companies showed increases. Making the customary allowance for coal used at mines, the total anthracite mined in 1910 was approximately 72,045,500 long tons, or 80,690,960 short tons.

Coal receipts at Boston, 12 months ended Dec. 31, reported by Chamber of Commerce, in long tons:

	1909.	1910.	Changes.
Anthracite	1,706,659	1,826,124	I. 119,465
Bituminous	3,495,011	4,107,294	I. 612,283
Total domestic	5,201,670	5,933,418	I. 731,748
Foreign	228,297	296,564	I. 68,267
Total	5,429,967	6,229,982	I. 800,015

The foreign coal is nearly all from Nova Scotia mines.

Shipments of coal from Buffalo by lake for the year ended Dec. 31, were 3,052,706 tons in 1909, and 3,639,368 in 1910; an increase of 586,662 tons. The larger shipments in 1910 were 1,376,312 tons to Chicago; 1,250,872 to Superior and Duluth; 416,358 to Milwaukee. Exports, to Canadian ports, were 320,677 tons.

Coal receipts at St. Louis, 10 months ended Oct. 31, were 5,592,869 tons in 1909, and 7,265,036 in 1910; increase, 1,672,167 tons.

Current Prices of Metal, Minerals, Coal and Stocks, Conditions and Commercial Statistics

Coal passing locks on the Monongahela river above Pittsburg, 10 months ended Oct. 31, was 7,524,180 short tons in 1909, and 7,699,680 in 1909; increase, 175,500 tons.

Coal and coke tonnage of Virginian Railway, five months of fiscal year, from July 1 to Nov. 30, short tons:

	Commercial.	Company.	Total
Coal	829,336	69,380	898,716
Coke	9,687	.....	9,687
Total	839,023	69,380	908,403
Total, 1909	339,837	.....	339,837

In 1909 the road was only partly open for traffic. In 1909 coal for use of company was not reported.

New York

Anthracite

Jan. 11—The market is in good condition, and has quite recovered from the holiday rest. Current demand is good. The large production in December has, apparently, been well absorbed.

Schedule prices for domestic sizes are $4.75 for lump, $5 for egg and stove and $5.25 for chestnut, all f.o.b. New York harbor. For steam sizes current quotations are $3@3.25 for pea, $2.30@2.75 for buckwheat, $1.85@2.15 for No. 2 buckwheat or rice; $1.35@1.50 for barley; all according to quality, f.o.b. New York harbor.

Bituminous

The seaboard bituminous trade is dull. It has not revived since the new year, and buying is light. All-rail trade is a little better, but not much. Sellers and not buyers are on the hunt.

Prices are a little uneven. Gas coals bring $1@1.10 at mine for ¾-in., 95c.@$1 for run-of-mine, and 70c. for slack. Fair steam coals can be had for $1.15 at mine; prices ranging down to $1 for low quality and up to $1.35 at mine for the best.

Car supply is better than it has been on most roads; but transportation is slow, and coal takes three or four days over schedule to come to tide.

In the coastwise trade vessels are scarce and the weather bad. The combination has sent rates up. From New York to points around Cape Cod 90c.@$1 is charged. At Philadelphia boats are very scarce, as they wil not go up the Delaware for fear of trouble with ice.

Birmingham

Jan. 6—Coal production in Alabama and throughout the South is active with the new year. Every endeavor is being made to get out coal to fill orders on hand. There are orders on hand with some companies that will require a large production at mines for some time. The belief is expressed that the demand through the entire year just started will be such as to warrant a full operation of mines on all sides.

Chief State Mine Inspector James Hillhouse states that a good start has been made, and that efforts are being made to get additional labor. There is a good demand for coke in this section.

Chicago

Jan. 10—Cold weather has made the coal market fairly firm, for both steam and domestic sorts, and there is less talk among dealers about the danger of general congestion of shipments in Chicago yards and consequent cutting of prices to escape demurrage charges. Transportation delays also have aided in keeping down the supply of coal, and have not become so serious as to imperil the market's needed supply. With extremely variable weather all over Chicago territory the market becomes brisk one day and slow the next, but the general tendency on the part of both consumers and retailers under such conditions is to lay in stocks for the rest of the winter, and this aids demand greatly.

Illinois coal is stronger on lump and screenings are somewhat more in demand. Car prices on Illinois and Indiana lump are $2.10@3.05, run-of-mine $1.80@2, and screenings $1.55@1.70. Eastern coals are in general firm at $4.30 for smokeless lump and $3.30 for smokeless run-of-mine; $3.40 for Hocking. Anthracite sells well in both city and country, with chestnut still scarce.

Cleveland

Jan. 9—Dealers are all busy owing to the cold weather. Stocks are low, but fortunately the railroads have been doing much better, and supplies are coming in quite freely. The balance is close enough, however, to keep everyone on the jump to get coal on time. Quotations are nominally unchanged.

Indianapolis

Dec. 7—The closing week of the year was comparatively quiet in the coal-min-

ing business. There is no evidence, however, of any weakness in prices, though the demand from dealers in the cities for domestic coal has slackened considerably. The same is true regarding steam coal. This is not unusual for the closing week of the year, when most industrial enterprises slow up to take account of business. A week of zero weather would exhaust the dealers' supply. The power-station consumers who buy direct from the mines took a little above the average amount of coal during Christmas week. This was due to the heavy traffic on electric railroads. The work in the mines for the month of December was a little above the average.

The opening week of the new year was also rather quiet, but demand increased a little, owing to the prospect of colder weather.

Pittsburg

Jan. 10—The coal market continues quiet but prospects are somewhat more favorable as industrial plants are showing signs of increasing their operations. Prices are fairly steady, but continue to be shaded upon occasion. There has been very little contracting for periods, as most contracts run April 1 to March 31. We continue to quote: Mine-run and nut, $1.15; ¾-in., $1.35; 1¼-in. $1.40; 82½ @85c. per ton.

The meeting last Saturday afternoon at the Chamber of Commerce in the matter of the Pittsburg coal rate to the Lakes attracted much interest. It was substantially a hearing given by the transportation committee of the chamber to the Pittsburg coal interests to permit them to present their case, while at a later meeting the railroad interests will be allowed to present theirs. The committee will then weigh the matter and if it sees fit make a recommendation to the Chamber. The attitude of the coal interests, however, seems absolutely fixed that no concessions can be expected by negotiation with the railroads and that ultimately the case must be taken to the Interstate Commerce Commission. Accordingly, what is being done now is regarded partly as a formality prior to taking the case to Washington, and partly as a means of arousing and bringing together the interested shippers. The issue is the divergence between ton-mile rates from Pittsburg to the Lake and ton-mile rates from West Virginia and contiguous fields to the Lakes. The issue is one of long standing but the Pittsburg coal operators are particularly exercised at this time on account of the great increase in Lake shipments from the other districts.

Connellsville Coke—The market has been very quiet in the past week, and nothing of importance has been done since the contracts made late in December involving about 50,000 tons of furnace coke monthly, chiefly for the first half, one contract being for the entire year, the purchasers being the Reading Iron Company, the Bethlehem Steel Company, the Girard Iron Company and Corrigan, McKinney & Co. One of these contracts, for first half, was made at $1.60, but it is believed that a first-half contract could now be put through at $1.50, contracts for the entire year commanding $1.60. Others of the contracts mentioned are understood to have been closed on a ratio basis to the prevailing price of pig iron. We quote: prompt furnace, $1.40@1.45; contract furnace, $1.50@1.60; prompt foundry, $2@2.10; contract foundry, $2.25@2.50 at ovens.

The *Courier* reports production in the Connellsville and lower Connellsville region in the week ended Dec. 31 at 239,525 tons, a decrease of 53,000 tons; shipments at 2096 cars to Pittsburg, 3757 cars to points west and 735 cars to points east, a total of 6588 cars.

St. Louis

Jan. 9—The market is rather a disappointment this week; in spite of the fact that the new year opened up very cold for a few days it did not seem to give the coal business much of an impetus. Stocks on hand seem to be fairly heavy and the demand light. Dealers do not seem to be doing as much as would be expected at this season.

Steam coal is in better demand since the first of the year and screenings are in excellent demand at good prices. The tonnage on the whole for December, while approximately the same as last year, was considerably less than in November. While the car shortage is still being felt on some lines yet owing to the poor market conditions very little is being heard about it. Railroads are beginning to be a little more lenient with car restrictions and are raising their embargoes.

Current prices in the St. Louis market are as follows:

Illinois, Standard:	Mine.	St. Louis.
6-in. lump and egg	$1.40	$1.92
2-in. lump	1.10	1.62
Mine-run	1.00	1.52
Screenings	0.60	1.12
Trenton:		
6-in. lump and egg	2.25	2.77
3-in. nut	2.00	2.52
Staunton or Mt. Olive:		
6-in. lump	1.80	1.32
2-in. lump	1.75	2.27
Mine-run	1.20	1.72
Screenings	0.60	1.12
Carterville:		
6-in. lump or egg	1.75	2.42
3-in. nut	1.50	2.17
Mine-run	1.25	1.92
Screenings	0.75	1.42
Pocahontas and New River:		
Lump or egg	2.25	4.75
Mine-run	1.25	3.75
Pennsylvania Anthracite:		
Chestnut	....	7.20
Stove or egg	....	6.95
Grate	....	6.70
Coke:		
Connellsville foundry	....	5.40
Gas house	....	4.90
Smithing	....	4.15

Prices at East St. Louis are 20c. per ton below the St. Louis quotations.

Anthrccite—The market is good though the tonnage is lighter. Dealers are beginning to buy sparingly, not wishing to carry over anything after April 1. There is also a pretty good demand for smokeless coal.

FOREIGN·COAL·TRADE

United States Coal Exports—Exports of coal and coke from the United States, with coal furnished to steamships in foreign trade, 11 months ended Nov. 30, long tons:

	1909.	1910.	Changes.
Anthracite	2,644,783	2,754,214	I. 109,431
Bituminous	9,009,704	10,022,297	I. 1,012,593
Total exports	11,654,487	12,776,511	I. 1,122,024
Steamer coal	5,651,204	5,933,516	I. 282,312
Total	17,305,991	18,710,027	I. 1,404,336
Coke	810,296	793,921	D. 16,375

Canada took this year 9,790,759 tons of coal, or 76.6 per cent. of the total exports. Cuba took 777,142 tons of coal. The coke went chiefly to Mexico and Canada.

United States Coal Imports—Imports of coal and coke into the United States, 11 months ended Nov. 30, long tons:

	1909.	1910.	Changes.
Anthracite	2,125	162	D. 1,963
Bituminous	1,118,794	1,815,356	I. 696,562
Total coal	1,120,919	1,815,518	I. 694,599
Coke	157,550	147,555	D. 9,995

Canada furnished this year 1,531,300 tons of coal and nearly all the coke; Australia, 212,978 tons of coal; Japan, 55,948 tons of coal. Imports are chiefly on the Pacific Coast and in the far northwestern States. Anthracite imports not reported since July 1 of this year.

Welsh Coal Prices—Messrs. Hull, Blyth & Co., London and Cardiff, report prices of coal on Dec. 31 as follows: Best Welsh steam coal, $4.02; seconds, $3.84; thirds, $3.72; dry coals, $3.70; best Monmouthshire, $3.60; seconds, $3.42; best steam small coal, $2.28; seconds, $2.04. All prices are per long ton, f.o.b. shipping port, cash in 30 days, less 2½ per cent. discount.

IRON·TRADE·REVIEW

New York, Jan. 11—The iron and steel markets for the first full week of the year have been quiet. Almost everyone is waiting for the result of the meeting of manufacturers which is being held in New York today and tomorrow. The general opinion is that no positive action on prices will be taken, and that any readjustment will be postponed until a little later. Meantime little or nothing is being done in the way of new orders for finished material.

In pig iron a little more business is reported, both in foundry and basic iron. In Eastern territory there are many inquiries coming in and some of them look as if they meant business. Consumers' stocks are generally low, and they show some desire to resplenish them.

The retirement of W. E. Corey from the presidency of the Steel Corporation has given occasion for lots of gossip. The most common talk is that it is the result of differences of opinion with Judge Gary, the actual head of the corporation. Mr. Corey is an old Carnegie man and may have preferred the Carnegie policy to the present one. This talk is formally denied, and Mr. Corey himself says simply that he wants a rest and is going to take one. It may—or may not—be significant, but it is pointed out that the old Carnegie men are being gradually eliminated from the higher offices of the corporation.

James A. Farrell has been chosen president of the Steel Corporation to succeed Mr. Corey. He has been for seven years president of the United States Steel Products Company, the subsidiary which handles the export business of the corporation. He is not a practical steel maker, as the previous presidents have been, but rather a selling and financial man.

The United States Steel Corporation reports unfilled orders on the books Dec. 31 at 2,674,757 tons; which compares with 2,760,413 on Nov. 30; 2,871,949 on Oct. 31; and 3,158,106 tons at the end of September.

Baltimore

Jan. 9—Exports from the port of Baltimore for the week included 636,425 lb. spelter and 3,035,700 lb. steel billets to Liverpool. Imports included 507 tons ferromanganese from Liverpool; 1200 tons spiegeleisen from Rotterdam; 7278 tons iron pyrites and 3816 tons cupreous pyrites from Huelva, Spain; 5500 tons manganese ore from Brazil; 14,950 tons iron ore from Cuba.

Birmingham

Jan. 9—A slight improvement in the pig-iron market in Southern territory is noted. The business being transacted right now is in small lots and is in the main for immediate delivery. The make in Southern territory has been curtailed further, in fact it is but little over the demand. Statistics gathered show that there was but little, if any, reduction of accumulated stocks of iron during December. The production of iron in Alabama for December went to 143,839 tons, while the total output for the year is given at 1,906,939 tons, against 1,703,688 tons in 1909. One furnace has been blown out already in January. The cast-iron pipe plants throughout the Southern field have taken up operations again. The foundries and machine shops are a little slow in getting back to steady work. The make is not to be increased until the demand improves and some of the stocks have been worked off.

The Tennessee company will start up its steel plant at Ensley on Jan. 15. There is not a great amount of steel or rail on hand.

Chicago

Jan. 10—The iron market continues quiet, the expectations of buyers and sellers alike being fixed on the possibilities of price reductions of steel products. What little pig-iron buying there is comes from the melters, who are running short on their current business and need small lots to keep foundries going. The market, in short, is a waiting one, and is expected to continue such until price questions are settled, for the immediate future at least. Considerable inquiry is being made for second-quarter deliveries, showing that the large interests are watching the market. Those well informed in the trade predict a wave of large buying with the resumption of railroad purchases which, it is said, cannot be far distant, or with the feeling general among consumers of pig iron that the bottom of the market has been reached.

Southern iron continues to be quoted nominally at $11, Birmingham, or $15.35, Chicago, and Northern at $16 for No. 2. A large sale of either doubtless could be made at 50c. less, and some of the larger of the current small lots are said to be sold at 25c. less.

Coke is weak, with the best Connellsville holding to $4.90, Chicago.

Cleveland

Jan. 9—Nothing doing yet about ore prices. The question is complicated by the fact that many furnaces have undelivered balances on 1910 contracts.

Pig Iron—Business is beginning to look up a little. There are quite a number of inquiries, and these are developing a good deal of discussion over prices. Quotations are nominally unchanged, but are uncertain just now.

Finished Material—It is too early for much development of business as yet, especially in view of the uncertainty as to prices. Specifications on contracts are coming in better than for several weeks.

Philadelphia

Jan. 11—A few rather important sales of pig iron were made this week, mostly to New Jersey, New York and New England concerns, which have been watching the market closely for several weeks. The iron was mostly for foundry purposes, but included a fair percentage of malleable iron. This business represents only current requirements, none of the larger consumers yet showing any desire to go into long contracts. Basic pig is still the subject of talk between buyers and sellers. No upward tendency is manifest in any line of crude iron. The large amount of idle capacity is the cause of absolute indifference. No. 2X is $16; forge, $14.25; basic nominally, $15, while general dullness prevails.

Steel Billets—Eastern markets are lifeless.

Bars—Mill reports from the interior show only moderate orders for stores. Manufacturers are trying to get in line for some of the new car-building orders soon to be awarded.

Sheets—The view of manufacturers is that no desirable business is to be had from offering concessions at this time. Certain large buyers have been pursuing a hand-to-mouth policy for months in view of a general break in quotations.

Pipes and Tubes—Stocks of pipe are sufficiently large to warrant further curtailment of output. No open reductions have been made on discounts. Only the customary small winter business is being done. Tubes are active.

Plates—A stronger undertone has been imparted to the Eastern plate markets by well defined rumors of large orders for cars and other work involving plates and shapes. Prices cannot advance. There are too many manufacturers on the war path for business.

Structural Material—After a long period of discouragement, new business is in sight from all quarters. No material improvement has yet taken place, but there is a much stronger undertone.

Scrap—Scrap is now being offered on favorable terms and dealers are cautiously stocking up after canvassing probabilities among large scrap buyers.

Pittsburg

Jan. 10—Nothing of importance marketwise is expected to be done in connection with the dinner of steel manufacturers tomorrow night in New York. The importance of the meeting seems to have been exaggerated in many quarters and the much talked of "series of meetings" of different branches of the steel trade is not materializing. A meeting of the sheet manufacturers was held in Pittsburg Saturday and a meeting of the structural mills in New York Wednesday afternoon, but otherwise no meetings seem to have been called. There is a large and growing contingent among manufacturers favoring the discontinuance of these meetings, as the chief effect they have been able to observe is that they tend to produce nervousness and procrastination on the part of buyers.

There has been a slight improvement in buying and specifying in steel products since the first of the month, doubtless because the inventory date is past and some requirements which had backed up have been released. The feeling in the steel-producing trade is that demand for iron and steel awaits a general improvement in business condition; also that buyers accumulated large surpluses of material during the recent movement and must work the last of them off, production meanwhile having dropped below normal.

Finished-steel prices are being firmly maintained all along the line, and the market is stronger, at least superficially, than it was at the close of November. Nominal prices are the same, but these nominal prices are the market, whereas in November there was considerable shading.

Pig Iron—Sales of malleable iron of 3000 tons for first half, 100 tons for prompt and 250 tons for prompt delivery have been made at $13.50, Valley. This iron is practically basic iron, which also commands $13.50. The efforts to set up a central selling agency for basic iron, all furnaces coming in, have not thus far been successful. An inquiry for 5000 tons of bessemer iron, from an Eastern interest, has been withdrawn and the purchase has probably been made in the East. Foundry iron is moving in a limited way at former prices, $13.75@14, Valley. The American Steel Foundries is out with an inquiry for 10,000 tons of basic for first half, for its Alliance and St. Louis plants.

Ferromanganese—The market continues quiet and is somewhat softer, being quotable at $38.25, Baltimore.

Steel—The market is quiet. Many mills did not take their full allotments under contracts in the closing months of the year, and much tonnage has been carried over, forestalling any important demand at this time. Nominally at least, prices are strictly held, at $23 for billets and $24 for sheet bars, bessemer or open hearth, Pittsburg or Youngstown mills, with full freight from nearer point to point of delivery. Rods are quotable at $27.50 per ton.

Sheets—Last Saturday's meeting of sheet interests was attended by representatives of the leading interest and of nearly all the independents. Several claims of cutting were aired and the proneness of manufacturers to make mistakes in quoting when they are not busy was again illustrated. On the whole, however, it was found that prices had been very well maintained since the meeting of Dec. 8. The leading interest reported running at 42 per cent. of capacity, against 37 per cent. at the time of the previous meeting, and the surprising information was given that precisely one-half of the tonnage was for export. The independents reported various operations, some plants going at 65 to 75 per cent. of capacity, others down to 25 per cent., while a few were closed entirely. We quote the market steady at 2.20c. for black sheets, 3.20c. for galvanized, $1.55 for painted corrugated roofing and $2.75 for galvanized corrugated.

St. Louis

Jan. 9—The pig-iron market is dull and little interest has been shown as yet. Everyone is holding off and buying only for immediate needs. All the orders that are being received are in small lots. The current price is $11 per ton, Birmingham, or $14.75, f.o.b. St. Louis.

FOREIGN IRON TRADE

British Pig Iron—The production of pig iron in Great Britain for the first half of 1910 was 4,993,745 long tons, an increase of 75,107 tons over the second half of 1909, and of 278,066 tons over the first half. As compared with the second half of 1909, there was a decrease of 185,000 tons in forge and foundry iron; an increase of 239,000 tons in basic pig, and an increase of 21,000 tons in bessemer pig.

Unsold stocks of iron in the Cleveland district on Dec. 31, were 520,000 tons, or 130,000 tons more than at the beginning of the year.

METAL MARKETS

New York, Jan. 11—The metal markets have been generally quiet with no marked changes, except a further sharp advance in tin.

Our index number for the metals, calculated on the approximate production and sales of pig iron, copper, tin, lead, zinc and aluminum, was 127 for the month of January; 124 for February; 118 for March; 118 for April; 113 for May; 107 for June; 112 for July; 113 for August; 114 for September; 111 for October; 117 for November; 115 for December.

Gold, Silver and Platinum

UNITED STATES GOLD AND SILVER MOVEMENT

Metal.	Exports.	Imports.	Excess.
Gold:			
Nov. 1910..	$1,376,011	$ 4,313,500	Imp.$ 2,937,489
" 1909..	15,649,281	3,863,637	Exp. 11,785,644
Year 1910..	57,444 422	54,245,886	" 3,198,536
" 1909..	122,301,517	42,003,194	" 80,298,323
Silver:			
Nov. 1910..	5,265,595	4,827,254	Exp. 438,341
" 1909..	4,951,483	4,694,807	" 256,676
Year 1910..	51,299,913	41,479,718	" 9,820,195
" 1909..	52,294,344	41,984,006	" 10,310,338

Exports from the port of New York, week ended Jan. 7: Gold, $520,000, chiefly to Haiti; silver, $880,657, principally to London and Paris. Imports: Gold, $232,656; silver, $212,572, from Central and South American and Japan.

Gold—Prices on the open market in London were unchanged at 77s. 9d. per oz. for bars and 76s. 4½d. per oz. for American coin. Supplies were divided between India and Berlin.

Platinum—The market in Paris is reported stronger. Business here is quiet, but prices are a little higher, dealers asking $39@39.50 per oz. for refined metal. At the same time, some lots have been offered for resale, and it is said that $38@38.50 has been accepted on these parcels.

Our Russian correspondent writes under date of Dec. 22 that demand is weaker as is always the case at the holiday season; the demand from Paris has also declined. Prices are a little weaker also. At Ekaterinburg crude metal, 83 per cent. platinum, is sold at 8.40@8.50 rubles per zolotnik—average, $31.77 per oz. For the same grade 32,500@32,600 rubles per pood—average, $31.90 per oz. —is asked at St. Petersburg.

SILVER AND STERLING EXCHANGE

Jan.	5	6	7	9	10	11
New York....	54⅛	54⅛	54⅜	55	54¾	54¾
London	25⅛	25⅛	25¼	25⅛	25¼	25⅛
Sterling Ex..	4.8515	4.8565	4.8595	4.8585	4.8590	4.8540

New York quotations, cents per ounce troy, fine silver; London, pence per ounce, sterling silver, 0.925 fine.

Silver—The market advanced this week on buying for Indian Bazaars and closes firm at 25 5/16d. in London.

Copper, Tin, Lead and Zinc

NEW YORK

Jan.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Tin. Cts. per lb.	Lead. New York, Cts. per lb.	Lead. St. Louis, Cts. per lb.	Zinc. New York, Cts. per lb.	Zinc. St. Louis, Cts. per lb.
5	12⅝ @12¾	12.35 @12.45	39⅝	4.50	4.32½ @4.35	5.50 @5.52½	5.35 @5.37½
6	12⅝ @12¾	12.35 @12.45	39⅝	4.50	4.32½ @4.35	5 50 @5.52½	5.35 @5.37½
7	12⅝ @12¾	12.35 @12.45	39⅝	4.50	4.32½ @4.35	5 50 @5.52½	5.35 @5.37½
9	12⅝ @12¾	12.35 @12.40	40⅜	4.50	4.32½ @4.35	5.50 @5.52½	5.35 @5.37½
10	12⅝ @12¾	12.35 @12.40	40⅜	4.50	4.32½ @4.35	5 50 @5.52½	5.35 @5.37½
11	12⅝ @12¾	12.35 @12 40	40	4.50	4.32½ @4.35	5 50 @5.52½	5.35 @5.37½

The New York quotations for electrolytic copper are for cakes, ingots and wirebars, and represent the bulk of the transactions made with consumers, basis New York, cash. The prices of casting copper and of electrolytic cathodes are usually 0.125c. below that of electrolytic. The quotations for lead represent wholesale transactions in the open market. The quotations on spelter are for ordinary Western brands; special brands command a premium.

Copper—The market has continued dull on the whole, although some substantial transactions have been effected. This business has been done, however, at the expense of prices. The chief feature of the week has been the offering down of copper by one of the agencies that previously had been holding aloof. After the publication of the statistics on Monday sellers were more disposed to make concessions. Buyers are generally adhering to a hand-to-mouth policy, notwithstanding that they are believed to be but poorly covered. At the close we quote Lake copper at 12⅝@12¾c.; electrolytic in cakes, ingots and wire bars at 12.35@12.40c.; and casting nominally at 12½@12⅜ as the average of the week.

LONDON

Jan.	Copper. Spot.	Copper. 3 Mos	Copper. Best Sel'td	Tin. Spot.	Tin. 3 Mos	Lead, Spanish.	Zinc, Ordinaries.
	56¾	57 3/16	60	181	180	13¼	24
6	56⅝	57 1/16	60¼	179⅛	179¼	13⅛	24
7	.....	.....	.....	.....	.....	.....	.....
9	56 15/16	57 3/16	59¾	183⅜	183¼	13⅛	24
10	55⅞	56 1/16	59¾	185¼	185¾	13⅛	24
11	55⅞	56 3/16	59½	183⅛	183¾	13⅛	24

The above table gives the closing quotations on London Metal Exchange. All prices are in pounds sterling per ton of 2240 lb. Copper quotations are for standard copper, spot and three months, and for best selected, price for the latter being subject to 3 per cent. discount. For convenience in comparison of London prices in pounds sterling per 2240 lb., with American prices in cents per pound the following approximate ratios are given: £10 = 2.17½c.; £12 = 2.61c.; £23=5c.; £60 = 13.04c. ± £1 = ± 0.21¾c.

Copper sheets are 18@19c. base for large lots. Full extras are charged, and higher prices for small quantities. Copper wire is 14¼c. base, carload lots at mill.

The London standard market interpreted the December statistics unfavorably and some bear selling ensued, under which the price declined, and at the close standard is quoted at £55 7s. 6d. for spot and £56 3s. 9d. for three months.

Copper exports from New York for the week were 9493 long tons. Our special correspondent gives the exports from Baltimore for the week at 2310 tons.

Justice Bischoff, of the Supreme Court of New York, on Dec. 28, granted a motion for the examination of the American Smelting and Refining Company, in the suit brought by the United Metals Selling Company for $1,000,000 damages. The selling company for several years was taking all of the smelting company's copper at quotational averages. The suit is based upon allegations that the smelting company made the plaintiff on the falling market of 1907 take copper that was not the defendant's product, as the result of which the damages demanded were suffered.

Tin—Transactions in the London market were heavy and quotations scored a considerable advance. Operators seem to have confidence in the strength of the market, which is evidenced by the large purchases of future tin which advanced the three months quotation over spot. Consumers in this market seem to have become convinced that the advance in the metal is due to legitimate causes, and have entered the market more liberally than for some time past. At the close a reaction set in, and the market is quoted £183 2s. 6d. for spot and £183 15s. for three months; about 40c. in New York.

Lead—There is a fair business doing at 4.32½@4.35c. in St. Louis and 4.50c. New York.

The London market for Spanish lead is unchanged at £13 2s. 6d. and English lead at £13 5s. per ton.

Spelter—A fair business is reported, both for prompt and future delivery and the market is somewhat firmer. St. Louis is quoted 5.35@5.37½ and New York 5 50@5.52½ cents.

The London market is firm, good ordinaries being quoted at £24 and specials 2s. 6d. higher.

Base price of zinc sheets is $7.50 per 100 lb., f.o.b. La Salle-Peru, Ill., less 8 per cent. discount.

Reports have been made at Joplin anent the brewing of a combination of the zinc smelting companies and the producers of the Joplin district. In fact, no such combination is brewing.

Other Metals

Aluminum—The market has been weak and prices are lower. We quote No. 1 ingots at 21@22c. per lb., New York.

Antimony—The market shows more activity than for some time past, and there has been some selling, with prospects of more. Cookson's has been advanced to 8¼c. per lb.; while U. S. sells at 7⅝@7¾c., and 7⅛@7⅜c. is named for outside brands.

Quicksilver—The market is rather quiet, but steady, with prices unchanged. The New York quotations are $42 per flask of 75 lb. for large lots; $44@45 for jobbing orders. San Francisco, $41.50 for domestic business and $2 less for export. London price is £8 per flask, £7 10s. being quoted by second hands.

Cadmium—Current quotations are 60@70c. per lb. in 100-lb. lots, f.o.b. New York, according to quantity of metal.

Magnesium—The price of pure metal is $1.50 per lb. for 100-lb. lots, f.o.b. New York.

Nickel—Large lots, contract business, 40@45c. per lb. Retail spot, from 50c. for 500-lb. lots up to 55c. for 200-lb. lots. The price of electrolytic is 5c. higher.

Imports and Exports of Metals

Exports and imports of metals in the United States, 11 months ended Nov. 30, are reported as follows, in the measures usual in the trade:

Metals:	Exports.	Imports.	Excess.
Copper, long tons	280,730	138,360	Exp. 142,370
Copper, 1909....	282,489	128,086	Exp. 154,403
Tin, long tons....	599	43,985	Imp. 43,386
Tin, 1909.....	383	39,830	Imp. 39,447
Lead, short tons.	65,745	100,375	Imp. 34,630
Lead, 1909.....	82,852	104,205	Imp. 21,353
Spelter, sh. tons.	3,453	2,139	Exp. 1,314
Spelter, 1909....	2,432	9,402	Imp. 6,970
Nickel, lb.....	13,694,344	29,359,544	Imp. 15,665,200
Nickel, 1909....	10,712,669	19,282,172	Imp. 8,569,503
Antimony, lb.	296,670	9,248,138	Imp. 8,951,468
Antimony, 1909.	6,648	8,672,915	Imp. 8,666,267
Platinum, oz.....	.....	111,679	Imp. 111,679
Platinum, 1909.	.....	105,340	Imp. 105,340
Aluminum, value	$811,217	.....	Exp. $811,217
Aluminum, 1909	513,398	.....	Exp. 513,398

Ores, etc.:	Exports.	Imports.	Excess.
Zinc oxide, lb.	24,306,841	.....	Exp. 24,306,841
Zinc oxide, '09..	26,475,398	.....	Exp. 26,475,398
Zinc dross, lb....	8,850,394	.....	Exp. 8,850,394
Zinc dross, '09..	14,011,622	.....	Exp. 14,011,622
Zinc ores, lg. tons	15,590	68,839	Imp. 53,249
Zinc ores, 1909.	11,121	95,726	Imp. 84,605
Antim'y ores, lb.	.....	.....	.....
Ant. ores, 1909.	504	3,386,708	Imp. 3,386,204
Chrome ore, tons	30	38,579	Imp. 38,549
Chrome ore, '09	30	38,863	Imp. 38,833

Copper, lead and nickel (and antimony from Aug. 5, 1909) include the metal contents of ores, matte, bullion, etc. The exports given include reëxports of foreign material. Zinc contents of ore imported in 1910 were 48,403,850 lb.; not reported prior to date of new tariff. Quantity of antimony ore is not reported from Aug. 5, 1909, only metal contents being given. Imports of aluminum are not reported.

Zinc and Lead Ore Markets

Platteville, Wis., Jan. 7—The highest price paid this week for zinc ore was $44; the base price, 60 per cent. zinc, was $41@42.50. The base price paid for 80 per cent. lead ore was $54@56 per ton.

The report for the week ended Dec. 31 makes the total shipments from the district for the year 126,010,054 lb. of zinc ore, 11,275,174 lb. lead ore and 28,162,790 lb. sulphur ore.

SHIPMENTS, WEEK ENDED JAN. 7.

Camps.	Zinc ore, lb.	Lead ore, lb.	Sulphur ore, lb.
Mineral Point.....	967,870	.....	.....
Galena.....	521,600	.....	.....
Platteville.....	318,200	.....	235,800
Benton.....	170,500	.....	.....
Shullsburg.....	153,220	81,850	.....
Highland.....	62,000	60,000	.....
Cuba City.....	.....	120,710	915,130
Total.....	2,193,390	262,560	1,150,930

Shipped during the week to separating plants, 1,954,245 lb. zinc ore.

Joplin, Mo., Jan. 7—The highest price paid for zinc sulphide ore was $47 per ton, the base price $42@44 per ton of 60 per cent. zinc for all but a few carloads sold at $42@41 base. Zinc silicate sold on a base of $22@25 per ton of 40 per cent. zinc. The average price, all grades, was $41.70. A few choice bins of lead sold at $58, the greater bulk of the stock selling at $54@56. The average price, all grades, was $55.68 per ton.

Extreme cold weather assisted the restriction of the producers' combination to curtail the output, but the light buying of the smelters leaves a practically unchanged condition in reference to the reserve stock. If the week shows any change it will be toward an increased stock in the bins. The shipment was 3320 tons and the output approximated 3500 tons, a decrease of 40 per cent. from a normal high production. The new lead smelter at Webb City was blown in this week, with all bins full of lead ore. It is a very compact plant; half of it is now in operation.

The report for Dec. 31 gives the

completed statement for the year 1910 as follows: Zinc ore, 592,456,710 lb., value $11,817,375; lead ore, 88,074,940 lb., value $2,311,647; total values, $14,129,022 for the year.

SHIPMENTS, WEEK ENDED JAN. 7.

	Zinc lb.	Lead lb.	Value.
Webb City-Carterville	3,351,690	696,530	$89,886
Joplin	1,028,110	96,700	25,326
Alba-Neck	551,970	.....	12,420
Oronogo	412,680	.....	8,837
Galena	336,160	52,720	8,264
Duenweg	282,130	17,830	5,666
Aurora	190,080	.....	3,801
Spurgeon	223,560	9,550	3,584
Miami	50,090	66,180	2,537
Carthage	66,070	.....	1,387
Carl Junction	54,940	.....	1,262
Sarcoxie	64,400	.....	1,255
Granby	25,600	3,480	460
Totals	6,638,480	942,990	$164,685

Zinc value, the week, $138,425.
Lead value, the week, 26,260.

MONTHLY AVERAGE PRICES.

Month.	Zinc Ore. Base Price.		Zinc Ore. All Ores.		Lead Ore. All Ores.	
	1909.	1910.	1909.	1910.	1909.	1910.
January	$41.25	$47.31	$38.46	$45.16	$52.17	$56.99
February	36.94	40.69	34.37	39.47	50.50	53.64
March	37.40	43.60	34.71	39.71	50.82	51.26
April	38.63	41.00	37.01	39.33	55.63	49.72
May	40.06	40.19	37.42	37.51	56.59	48.16
June	44.15	40.20	40.35	37.83	57.52	48.80
July	43.06	39.63	41.11	36.80	53.74	48.59
August	48.25	40.13	44.54	37.32	57.60	49.75
September	47.70	43.45	44.87	39.96	56.11	54.73
October	49.50	43.31	45.75	40.50	55.02	53.18
November	51.31	47.20	48.29	43.20	53.94	54.80
December	49.45	42.50	47.57	40.70	55.26	55.70
Year	$43.98	$42.43	$41.20	$39.79	$54.60	$52.12

NOTE—Under zinc ore the first two columns give base prices for 60 per cent. zinc ore; the second two the average for all ores sold. Lead ore prices are the average for all ores sold.

CHEMICALS

New York, Jan. 11—The general markets have not recovered from the holiday season and are quiet.

Copper Sulphate—Business is fairly steady and prices unchanged at $4 per 100 lb. for carload lots and $4.25 per 100 lb. for smaller parcels.

Arsenic—The market is weak and prices low. White arsenic is quoted at $2.12½@2.37½ per 100 lb., with most sales at the lower level. Lower prices are expected.

Nitrate of Soda—Business remains quiet, with prices unchanged at 2.12½c. per lb. for both spot and futures.

Messrs. Mortimer & Wisner, New York, report the position of nitrate in the United States on Jan. 1 as follows, in long tons:

	1909.	1910.	Changes.
Stocks, Jan. 1	9,140	14,000	I. 4,860
Imports, 12 mos	364,158	449,640	I. 85,482
Total supplies	373,298	463,640	I. 90,342
Deliveries, 12 mos	359,298	450,850	I. 91,552
Stocks, Dec. 31	14,000	12,790	D. 1,210
Afloat for U. S.	100,000	100,000	.....

Quantities afloat include all cargoes due to arrive at United States ports by April 15 next. The increase in imports in 1910 was 24.2 per cent.; in deliveries or consumption, 25.5 per cent.

Imports and Exports—Imports and exports of chemicals and raw materials in the United States, 11 months ended Nov. 30:

	Imports.	Exports.	Excess.
Bleach, lb	91,029,083	496	I. 91,028,579
Bleach, 1909	82,838,721	13,964	I. 82,824,757
Potash salts, lb	462,930,021	2,156,139	I. 460,773,882
Potash salts,'09	378,038,346	2,295,682	I. 375,742,664
Soda salts, lb	34,937,342	500,960	I. 34,436,382
Soda salts, 1909	14,447,298	671,279	I. 13,776,019
Acetate lime, lb	.....	58,431,454	E. 58,431,454
Acetate, 1909	.....	65,718,107	E. 65,718,107
Nit. of soda, tons	480,731	5,300	I. 475,431
Nitrate, 1909	373,314	7,544	I. 365,770
Phosphates, tons	10,277	985,171	E. 974,894
Phosphates, '09	6,077	968,890	E. 962,813
Sulphur, tons	27,838	30,711	E. 2,873
Sulphur, 1909	25,014	30,921	E. 5,907
Pyrites, tons	733,438	.....	I. 733,438
Pyrites, 1909	630,438	.....	I. 630,438
Magnesite, lb	249,040,315	3,496,602	I. 245,543,713
Magnesite, 1909	68,762,448	701,595	I. 68,060,853
Sul. Ammonia,lb.	159,533,130	.....	I. 159,533,130
Sul. Am'nia, '09	72,742,867	.....	I. 72,742,867

Exports include reëxports of foreign material. Figures for magnesite not reported prior to July 1, 1909; imports above for 1909 are for five months only. Estimating sulphur contents of pyrites, the total imports of sulphur in 1910 were 321,213 tons.

MINING STOCKS $

New York, Jan. 11—Advances in stocks have been made on the general market, in the face of some unfavorable considerations, such as the bank troubles in New York. These troubles have been smoothed over and adjusted for the present. The market, however, has been entirely a trading one, and public interest seems low, or absent altogether, notwithstanding the apparent advancing tendency.

American Smelting and Refining stockholders have voted to approve the issue of $15,000,000 additional stock, making $115,000,000 the total.

There were several sales of Homestake during the week, 200 shares changing hands at $85.50@87 per share.

The Curb was rather dull throughout the week. Changes in quotations were fractional and business was on a small scale and narrow. The copper stocks were dealt in on a moderate scale only and showed small changes. Standard Oil was more active and advanced sharply.

Boston, Jan. 10—A sharp and decisive drop in the price of Calumet & Hecla and subsidiary stocks was the feature of this market during the week. Calumet itself made a low at $510, or within $10 of its low price of 1910. Osceola also suffered severely, dropping $11.25 to $112.75. Superior broke $5 to $37.50, Tamarack $7 to $45 and La Salle fell almost $2 or close to $4 per share. Other subsidiary stocks such as Allouez, Centennial and Isle Royale also suffered severe declines.

This was due to the Calumet & Hecla merger plan in which considerable dissatisfaction has come to the surface among minority holders. This, however, is modifying in a way as officials of the big company explain certain points, which has tempered the angry mood at first created. These securities are now all selling on about a parity, although they have not rallied very much from the low prices.

These conditions did not help the balance of the mining-share list and al-

COPPER PRODUCTION REPORTS.
Copper contents of blister copper, in pounds.

Company.	October.	November.	December.
Anaconda	22,100,000	21,900,000	21,500,000
Arizona, Ltd	3,004,000	3,010,000	.....
Balaklala	928,360	.....	.....
Copper Queen	7,060,796	7,372,776	.....
Calumet & Ariz	1,990,000	1,930,000	.....
Detroit	1,757,836	1,849,939	.....
East Butte	948,369	618,191	.....
Imperial	*nil*	*nil*	.....
Mammoth	.....	.....	.....
Nevada Con	4,980,300	5,200,000	.....
Old Dominion	2,345,000	2,754,000	2,287,000
Shannon	1,286,000	1,420,000	.....
Superior & Pitts	2,095,000	2,160,000	.....
United Verde, est.	.....	3,000,000	.....
Utah Copper Co	7,582,212	7,468,515	.....
Lake Superior dis.	18,500,000	20,400,000	.....
Est. for non-reporting mines	13,250,000	.....	.....
Total production.	87,827,873	.....	.....
Imports, bars, etc.	24,292,368	24,835,954	.....
Total blister	112,120,241	.....	.....
Imp. in ore & matte	5,173,277	5,542,279	.....
Total	117,293,518	.....	.....
Brit. Col. Cos.:			
British Col. Copper	702,154	917,994	.....
Granby	1,184,234	1,410,261	.....
Mexican Cos.:			
Boleo	2,278,454	.....	.....
Cananea	3,576,000	3,658,000	.....
Moctezuma	1,791,108	1,654,235	.....

Lake Superior figures are estimated; others are reports received from companies, unless otherwise stated. Boleo copper does not come to American refiners.

STATISTICS OF COPPER.

Month.	United States Product'n.	Deliveries, Domestic.	Deliveries for Export.
Year, 1909	1,405,403,056	705,051,591	680,942,620
I, 1910	116,547,287	78,158,387	81,691,672
II	112,712,493	66,618,322	37,369,518
III	120,067,467	62,844,818	40,585,767
IV	117,477,639	67,985,951	31,332,434
V	123,242,476	59,305,222	45,495,400
VI	127,219,188	53,363,196	65,895,948
VII	118,370,003	56,708,175	59,407,167
VIII	127,803,618	67,731,271	61,831,780
IX	119,519,983	64,501,018	75,106,496
X	126,469,284	67,814,172	68,186,912
XI	119,353,463	60,801,992	67,424,316
XII	123,339,219	43,594,018	88,104,075
Year 1910	1,452,122,120	749,426,542	722,431,494

	Visible Stocks. United States.	Europe.	Total.
I, 1910	141,766,111	244,204,800	385,970,911
II	98,463,339	248,236,800	346,700,139
III	107,187,992	254,150,400	361,338,392
IV	123,824,874	249,625,600	373,450,474
V	141,984,159	246,870,400	388,854,559
VI	160,425,973	239,142,400	399,568,373
VII	168,386,017	232,892,800	401,278,818
VIII	170,640,678	222,320,000	392,960,677
IX	168,881,245	218,444,800	387,326,045
X	148,793,714	211,276,800	360,070,514
XI	139,261,914	198,060,800	337,322,714
XII	130,389,069	193,200,000	323,589,069
I, 1911	122,030,195	187,797,120	309,827,315

Figures are in pounds of fine copper. U. S. production includes all copper refined in this country, both from domestic and imported material. Visible stocks are those reported on the first day of each month, as brought over from the preceding month.

though moderate declines were recorded during the week a generally steady tone is manifest.

Island Creek securities had a fair upward move. A party of Boston men who have just returned from a tour of inspection of the property report encouragingly. This company earned $300,000 for the last half of 1910, or $50,000 net per month. This amount is equal to the full year's dividend on the 50,000 shares.

The Curb has been a dull place and without special feature. Several of the members are going out owing to the lack of business. One result of the Calumet & Hecla merger will be to cause 10 active stocks to be retired. This will result in the big exchange taking over several of the leading Curb issues.

Assessments

Company.	Delinq.	Sale.	Amt.
Alpha Con., Nev.	Jan. 12	Feb. 12	$0.05
Alta, Nev.	Jan. 16	Feb. 6	0.03
Amal. Nev. Mines Co.	Dec. 15	Jan. 15	0.05
Andes, Nev.	Jan. 19	Feb. 9	0.05
Belcher, Nev.	Jan. 3	Jan. 23	0.10
Big Elk, Ida.	Jan. 2	Feb. 2	0.002
Bullion, Nev.	Jan. 9	Feb. 7	0.05
Con. Imperial, Nev.	Jan. 5	Jan. 30	0.01
Con. Virginia, Nev.	Feb. 7	Feb. 28	0.25
Copper Crown, Ida.	Dec. 26	Feb. 1	0.002
Crown Point, Nev.	Jan. 30	Feb 5	0.10
Exchequer, Nev.	Jan. 24	Feb 14	0.05
Federal Ely, Nev.	Jan. 20	.....	0.01
Florence M. & M., Ida.	Feb. 20	Mar. 20	0.001
Fox Copper M. & M., Ida.	Jan. 6	Jan. 30	0.002
Gold Mt. Champion, Utah	Jan. 10	Jan. 25	0.00½
Ibex, Ida	Dec. 17	Jan. 17	0.002
Julia Con.	Jan. 19	Jan. 17	0.05
Keystone, Utah.	Dec. 15	Feb. 16	0.03
Mexican, Nev.	Jan. 10	Jan. 31	0.20
North Franklin, Ida.	Dec. 15	Jan. 16	0.005
Pac. Gold & Copper, Utah.	Jan. 12	Feb. 15	0.00½
Sierra Nevada, Nev.	Jan. 17	Feb. 8	0.10
Snowstorm Ext. Copper, Ida.	Jan. 7	Feb. 6	0.003
Teddy M. & M., Ida.	Jan. 20	Feb. 20	0.002
Utah, Nev.	Jan. 10	Jan. 31	0.05
Vienna Vein, Ida.	Dec. 15	Jan. 16	0.001

Monthly Average Prices of Metals

SILVER

Month.	New York.		London.	
	1909.	1910.	1909.	1910.
January	51.750	52.375	23.843	24.154
February	51.472	51.534	23.706	23.794
March	50.468	51.454	23.227	23.690
April	51.428	53.221	23.708	24.483
May	52.905	53.870	24.343	24.797
June	52.538	53.462	24.166	24.651
July	51.043	54.150	23.519	25.034
August	51.125	52.912	23.588	24.428
September	51.440	53.295	23.743	24.567
October	50.923	55.490	23.502	25.596
November	50.703	55.635	23.351	25.680
December	52.226	54.428	24.030	25.160
Total	51.502	53.486	23.706	24.670

New York, cents per fine ounce; London, pence per standard ounce.

COPPER

	New York. Electrolytic		New York. Lake.		London.	
	1909.	1910.	1909.	1910.	1909.	1910.
January	13.893	13.620	14.280	13.870	61.198	60.923
February	12.949	13.332	13.295	13.719	57.688	59.388
March	12.387	13.255	12.826	13.586	56.231	59.214
April	12.56½	12.733	12.93⅞	13.091	57.363	57.238
May	12.893	12.550	13.238	12.885	59.338	56.313
June	13.214	12.404	13.548	12.798	59.627	55.310
July	12.880	12.215	13.363	12.570	58.556	54.194
August	13.007	12.490	13.296	12.715	59.393	55.733
September	12.870	12.379	13.210	12 668	59.021	55.207
October	12.700	12.553	13.030	12.788	57.551	56.722
November	13.125	12.742	13.354	12.914	58.917	57.634
December	13.298	12.581	13.647	12.863	59.906	56.069
Year	12.982	12.738	13.335	13.039	58.732	57.054

New York quotations, cents per ounce troy, fine silver; London, pence per ounce, sterling silver, 0.925 fine.

TIN AT NEW YORK

Month.	1909.	1910.	Month.	1909.	1910.
January	28.060	32.700	July	29.125	32.695
February	28.290	32.920	August	29.966	33.972
March	28.727	32.463	September	30.293	34.982
April	29.445	32.976	October	30.475	36.190
May	29.225	33.125	November	30.859	36.547
June	29.322	32.769	December	32.913	38.199
			Av. Year	29.725	34.123

Prices are in cents per pound.

LEAD

Month.	New York.		St. Louis.		London.	
	1909.	1910.	1909.	1910.	1909.	1910.
January	4.175	4.700	4.025	4.582	13.113	13.650
February	4.018	4.613	3.868	4.445	13.313	13.328
March	3.986	4.459	3.835	4.307	13.438	13.063
April	4.168	4.376	4.051	4.225	13.297	12.641
May	4.287	4.315	4.214	4.164	13.225	12.550
June	4.350	4.343	4.291	4.207	13.031	12.688
July	4.321	4.404	4.188	4.291	12.563	12.531
August	4.363	4.400	4.227	4.290	12.475	12.513
September	4.342	4.400	4.215	4.289	12.781	12.582
October	4.341	4.400	4.215	4.271	13.175	13.091
November	4.370	4.442	4.252	4.314	13.047	13.217
December	4.560	4.500	4.459	4.363	13.125	13.197
Year	4.273	4.446	4.153	4.312	13.049	12.920

New York and St. Louis, cents per pound. London, pounds sterling per long ton.

SPELTER

Month.	New York.		St. Louis.		London.	
	1909.	1910.	1909.	1910.	1909.	1910.
January	5.141	6.101	4.991	5.951	21.425	23.350
February	4.889	5.569	4.739	5.419	21.562	23.188
March	4.757	5.637	4.607	5.487	21.438	23.031
April	4.965	5.439	4.815	5.289	21.531	22.469
May	5.124	5.191	4.974	5.041	21.975	22.100
June	5.402	5.128	5.252	4.978	22.000	22.094
July	5.402	5.152	5.252	5.002	21.969	22.406
August	5.729	5.279	5.579	5.129	22.125	22.800
September	5.796	5.514	5.646	5.364	22.906	23.165
October	6.199	5.628	6.043	5.478	23.200	23.900
November	6.381	5.976	6.231	5.826	23.188	24.083
December	6.249	5.624	6.099	5.474	23.094	24.019
Year	5.503	5.520	5.352	5.370	22.201	23.050

New York and St. Louis, cents per pound. London, pounds sterling per long ton.

PIG IRON AT PITTSBURG.

	Bessemer.		Basic.		No. 2 Foundry.	
	1909.	1910.	1909.	1910.	1909.	1910.
January	$17.18	$19.90	$16.40	$17.98	$16.26	$17.94
February	16.73	18.96	16.09	17.21	15.90	17.38
March	16.40	18.53	15.84	16.93	15.62	17.00
April	15.79	18.28	15.05	16.84	15.06	16.75
May	15.77	17.10	15.02	15.94	15.08	16.18
June	16.13	16.52	15.84	15.60	15.63	15.53
July	16.40	16.40	15.90	15.40	15.96	15.40
August	17.16	16.09	16.17	14.89	16.20	15.16
September	18.44	15.92	16.80	14.73	17.03	14.93
October	19.75	15.90	17 84	14.05	18.02	14.88
November	19.90	15.84	18.37	14.26	18.09	14.78
December	19.90	15.90	18.15	14.15	17.90	14.65
Year	$17.46	$17.10	$16.46	$15.65	$16.40	$15.83

STOCK QUOTATIONS

COLO. SPRINGS Jan. 10

Name of Comp.	Bid.
Acacia	.05
Cripple Cr'k Con.	.02½
C. K. & N.	.18½
Doctor Jack Pot	.08⅜
Elkton Con.	.74
El Paso	.85½
Fannie Rawlins	‡.05
Findlay	.06
Gold Dollar	.12½
Gold Sovereign	.03½
Isabella	.18½
Jennie Semple	.10½
Lexington	.01⅜
Moon Anchor	.02½
Old Gold	.04
Mary McKinney	.48
Pharmacist	.02⅝
Portland	1.03
Vindicator	.92½
Work	.03½

SALT LAKE Jan. 10

Name of Comp.	Bid.
Bingham Copper	‡.15
Carisa	‡.12
Colorado Mining	.35
Columbus Con	.18½
Daly Judge	‡4.25
Grand Central	.75
Iron Blossom	.89
Little Bell	.65
Little Chief	‡.22
Lower Mammoth	.10
Mason Valley	9.75
Maj. Mines	‡.53
May Day	.09
Nevada Hills	2.42½
New York	‡.13
Prince Con	.66
Silver King Coal'n	1.77½
Sioux Con	.33½
Uncle Sam	.46
Victoria	‡1.07½

SAN FRANCISCO. Jan. 10.

Name of Comp.	Clg.	Name of Comp.	Bid.
COMSTOCK STOCKS		MISC. NEV. & CAL.	
Alta	‡.05	Belmont	5.25
Belcher	.71	Jim Butler	.25
Best & Belcher	.27	MacNamara	.18
Caledonia	.28	Midway	.16
Challenge Con	‡.09	Mont.-Tonopah	‡.90
Chollar	.12	North Star	.04
Confidence	.44	West End Con	.55
Con. Cal. & Va	.77	Atlanta	.12
Crown Point	.60	Booth	.08
Gould & Curry	.16	C.O.D. Con	.11
Hale & Norcross	.13	Comb. Frac	.17
Mexican	.85	Jumbo Extension	.24
Occidental	.41	Oro	.05
Ophir	1.25	Silver Pick	.06
Overman	.26	St. Ives	.16
Potosi	‡.30	Tramps Con	.03
Savage	.11	Argonaut	‡1.00
Sierra Nevada	.11	Bunker Hill	‡7.25
Union Con	.25	Cent. Eureka	‡1.10
Yellow Jacket	.38	So. Eureka	‡6.25

N. Y. EXCH. Jan. 10

Name of Comp.	Clg.
Amalgamated	63⅛
Am. Agri. Chem.	47⅛
Am.Sm.&Ref.,com	74⅝
Am, Sm. & Ref., pf.	104¼
Anaconda	40
Batopilas Min	‡2
BethlehemSteel pf	60
Federal M. & S., pf.	‡58
Goldfield Con.	7⅛
Great Nor., orectf.	58
Homestake	85½
Nat'nalLead,com.	55
National Lead, pf.	108½
Nev. Consol.	18⅝
Pittsburg Coal,pf.	69
RepublicI&S,com.	32
Republic I & S, pf.	93½
SlossSheffi'd,com.	49¼
Sloss Sheffield, pf.	‡114¼
Tennessee Copper	33½
Utah Copper	46
U. S. Steel, com.	74
U. S. Steel, pf.	118
Va. Car. Chem.	63

N. Y. CURB Jan. 10

Name of Comp.	Clg.
Ariz.-Cananea	3⅛
Barnes King	‡⅛
Bonanza Creek	‡3
Braden Copper	4¼
B. C. Copper	6¾
Buffalo Mines	2½
Butte Coalition	18¾
Caledonia	⅝
Calumet & Mont.	‡90
Canadian Mines	‡6¾
Chino	22⅜
Cobalt Central	10
Con. Ariz. Sm.	1⅜
Davis-Daly	1½
Dominion Cop.	‡7
Ely Con	32
El Rayo	2⅛
Florence	1⅝
Giroux	6¾
Greene Cananea	6¾
Guanajuato	3
Guerrero	‡1⅛
Guggen. Exp.	197½
Kerr Lake	6⅛
La Rose	4⅞
McKinley-Dar-Sa.	1⅞
Miami Copper	19⅜
Mines Co. of Am.	6
Mont. Shoshone	.13
Nev. Utah M. & S.	⅞
Nipissing Mines	10¾
Ohio Copper	1½
Pacific Sm. & M.	1/16
Precious Metals	1⅛
Ray Central	2⅛
Ray Con	18
Red Warrior	1⅛
South Utah M.& S.	¾
Standard Oil	632
Stewart	‡¾
Tonopah	7⅝
Tonopah Ex	1.02
Tri-Bullion	⅛
Tularosa	⅛
Union Mines	⅛
Yukon Gold	3⅞

LONDON Jan. 11

Name of Com.	Clg.
Dolores	£1 10s 0d
Stratton'sInd.	0 2 3
Camp Bird	1 16 0
Esperanza	1 17 3
Tomboy	0 15 0
El Oro	1 6 3
Oroville	0 6 9
Mexico Mines	7 12 6

BOSTON EXCH. Jan. 10

Name of Comp.	Clg.
Adventure	‡7⅛
Algomah	8¼
Allouez	37
Am. Zinc	25⅛
Arcadian	‡4
Arizona Com	13⅞
Atlantic	6
Bonanza	‡.50
Boston & Corbin	12
Butte & Balak	‡6
Calumet & Ariz.	46¾
Calumet & Hecla	517
Centennial	13
Con. Mercur	‡6
Copper Range	68
Daly-West	3½
East Butte	11⅞
Franklin	9⅛
Granby	38
Hancock	21½
Helvetia	‡2
Indiana	12
Isle Royale	15
Keweenaw	‡3
Lake	34
La Salle	4⅞
Mass	7⅛
Michigan	3
Mohawk	‡46
Nevada	19
North Butte	27¾
North Lake	7
Ojibway	5⅜
Old Dominion	‡36¾
Osceola	112¾
Parrot	‡12
Quincy	70
Shannon	11¾
Superior	38½
Superior & Bost.	6
Superior & Pitts.	13¾
Tamarack	45
Trinity	4¼
U. S. Mining	35⅛
U. S. Mining, pf.	47
Utah Apex	2⅞
Utah Con	13½
Victoria	‡2½
Winona	8¾
Wolverine	‡118
Wyandot	‡11⅝

BOSTON CURB Jan. 10

Name of Comp.	Last.
Ahmeek	‡183
Bingham Mines	‡2½
Boston Ely	.90
Boswyocolo	‡.07½
Cactus	.21
Calaveras	‡2.00⅜
Champion	.03
Chemung	‡.08¼
Chief Cons	1½
Cons. Ariz.	1½
Corbin	4¾
Crown Reserve	‡21⅜
First Nat. Cop.	2
Inspiration	8⅝
Mackinaw	29
Majestic	.39
Nat'l Mine & Ex.	.03½
Nevada-Douglas	2¾
Oneco	‡2.00
Raven Copper	.47
Rhode Island Coal	5½
San Antonio	‡6
Shattuck-Ariz	‡24¼
South Lake	‡7
Superior & Globe	‡13
Trethewey	‡1¼
Tuolumne Copper	4⅛
Vulture	8⅞
Yuma	‡.30

‡Last quotation.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

ABRASIVES—		
Carbons, good drill quality, carat		$50.00@75.00
Carborundum, f.o.b. Niagara Falls, powd.	lb.	.08
Grains	"	.10@.17
Corundum	"	.07@.10
Crushed Steel, f.o.b. Pittsburg	"	.05¾@.06
Emery, in kegs; Turkish flour	"	.01¾@.02
Grains	"	.03½@.04
Naxos flour	"	.01¾@.02
Grains	"	.03½@.04
Chester flour	"	.01½@.02
Grains	"	.03½@.04
Peekskill flour, f.o.b. Easton, Pa.	"	.01¼@.01¾
Grains, in kegs	"	.02¾@.03
Garnet, per quality	sh. ton.	25.00@35.00
Pumice Stone, Am. Powd.	100 lb.	1.60@2.00
Italian, powdered	per lb.	.01⅜@.01¾
Lump, per quality	"	.03½@.30
Rottenstone, ground	"	.02@.04
Lump, per quality	"	.05@.20
Rogue, per quality	"	.05@.30
Steel Emery, f.o.b. Pittsburg	"	.07@.07½
ACIDS—		
Acetic 28%	lb.	.017½@.0215
Boric	"	.07
Hydrofluoric, 30%	"	.02¾@.03½
" 48%	"	.06
" 52%	"	.06½
" 60%	"	.10
Hydrochloric acid, 20° per 100 lb.		1.25@1.50
Nitric acid, 36° to 40°	per lb.	.03½@.04½
Sulphuric acid, 50°, bulk	per ton.	$12 up
60°, 100 lb. in carboys.		.85@1.12½
60°, bulk, ton		16.00@18.00
66°, 100 lb. in carboys.		1.00@1.10
66°, bulk, ton		18.00
Oxalic	per lb.	.07¼@.07¾
ALCOHOL—Grain 95%	gal.	2.54@2.56
Denatured	"	.42
Refined wood, 95@97%	"	.52@.57
ALUM—Lump	100 lb.	$1.75
Ground	"	1 85
Chrome Alum	"	.04½@.05
ALUMINUM—Sulphate, com'l.	lb.	.90@2.00
AMMONIA—24 deg. lb.	"	.04½@.05½
" 26 deg. lb	"	.04¾@.05¾
AMMONIUM—		
Bromide	lb.	.32
Carbonate	"	.08@.08¾
Muriate grain	"	.05½@.06
Lump	"	.09½@.09½
Sulphate, 100 lb.	"	2.85@2.90
Sulpho-cyanide com.	"	.25
" " chem. pure	"	.35
ANTIMONY—needle, lump	lb.	.04½@.05
Oxide	"	.07¼@.08
ARSENIC—white	"	.02½@.02¾
Red, Outside brands	"	.05½@.06½
Saxony	"	.06½@.06¾
ASPHALTUM—		
Barbadoes	per ton.	80.00@120.00
West Indies	"	30.00@60.00
Egyptian	lb.	.25@.30
Gilsonite, Utah ordinary	per ton.	32.00@40.00
Trinidad	"	20.00@30.00
California	per ton.	25.00@30.00
BARIUM—		
Carb. Lump. 80@90%	lg. ton.	26.00@35.00
Precipitated, 96@98%	"	31.00@33.00
Powdered, natural	lb.	.02@.02½
Chloride com'l	ton.	32.00@35.00
Nitrate powdered, in casks	lb.	.04¾@.05¾
Blanc Fixe, dry, bbl	per lb.	.02½@.04
BARYTES—		
Am. Ground	sh. ton.	10.00@13.00
Floated	"	16.00@17.00
Foreign floated	"	18.50@22.50
BLEACHING POWDER—35% 100 lb		1.25@1.40
BLUE VITRIOL—(copper sulphate), carload, per 100 lb.		4.00@4.25
BONE ASH	lb.	.02½@.04
BORAX, sacks	"	.03½@.
CALCIUM—Acetate, gray, 100 lb.		2.00@2.05
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton.	65.00
Chloride, f.o.b. N. Y.	"	11.00@14.10
CEMENT—Slag cement	bbl.	.75@1.25
Portland, Am. 400 lb	"	1.20@1.30
Foreign	"	2.25@2.90
"Rosendale," 300 lb.	"	.85
(in sacks)	"	.65
CHROME ORE—		
New Caledonia 50% ex. ship N. Y.	per lg. ton.	14.00@16.00
Bricks, f.o.b. Pittsburg, per M.		175.00
CLAY, CHINA—Am. common ex-dock, N. Y.	ton.	8.00@9.00
Foreign	"	11.50@18.00
COBALT—Oxide	lb.	.80@.85
COPPERAS—Bulk	100 lb.	$0.55
In bbls	"	.65@.85
In bags	"	.60@.80
CRYOLITE (carload)	lb.	.06½@.07
FELDSPAR—Ground	sh. ton.	6.00@14.00
FIRE BRICK—		
American	per M.	30.00@40.00
Imported	"	30.00@45.00
St. Louis	"	16.00
Extra	"	20.00@23.00
Special extra	"	30.00@35.00
FIRE CLAY—F.o.b. St. Louis.		
St. Louis, extra quality	per ton.	5.00
" ordinary	"	2.50
FLUORSPAR—		
Domestic f.o.b. Pittsburg:		
Lump	ton.	8.00@10.00
Ground	"	12.00@14.00
Foreign crude ex. dock	"	8.50
FULLER'S EARTH—Lump, 100 lb.		.80@.85
Powdered	"	.80@.85
GRAPHITE—Ceylon.		
Flying dust, finest to best	lb.	.02@.04
Dust	"	.02½@.05
Chip	"	.04@.08
Lump	"	.05½@.12
Large lump	"	.08½@.10½
GYPSUM—		
Fertilizer	sh. ton.	5.00
Ground	"	4.00@7.00
INFUSORIAL EARTH—		
Ground Am. Best	lb.	.01¾@.02½
German	"	.02½@.02¾
LEAD—Acetate (sugar of) brown,	lb.	.07¾@.09½
Nitrate, com'l.	"	.08¼
MAGNESITE—Greece.		
Crude (95%)	lg. ton.	7.50@8.50
Calcined, powdered	sh. ton.	26.00@37.00
Brick, domes, per qual. f.o.b. Pittsburg	M.	160@200
MAGNESIUM—		
Chloride, com'l	100 lb.	.90@1.25
Sulphate (Epsom salt)	100 lb.	.90@1.00
MANGANESE—		
Foreign, crude, powdered:		
70@75% binoxide	lb.	.01@.01½
75@85% binoxide	"	.01½@.01¾
85@90% binoxide	"	.01¾@.04
90@95% binoxide	"	.06½
Ore, 80%-85%	sh. ton.	16.00@32.50
MARBLE—Flour	sh. ton.	9.00@9.50
MINERAL WOOL—		
Slag, ordinary	sh. ton.	19.00
Selected	"	25.00
Rock, ordinary	"	32.00
MONAZITE SAND—		
Guar. 97%, with 5% Thorium oxide, normal	lb.	.08 and up
NICKEL—		
Oxide, crude, lb. (77%) for fine metal contained		.47
Sulphate, single	lb.	.10½@.11
Sulphate, double	"	.05½@.08
NITRATE OF SODA—		
100 lb. 95%		2.12½@2.15
95% for 1911		2.12½@2.15
96% is 2½@7½c. higher per 100 lb.		
OZOKERITE—best	lb.	.14@.17
PAINTS AND COLORS—		
Litharge, Am. powdered	lb.	.05¾@.06
English glassmakers'	"	.08½@.09½
Lithophone	"	.03½@.04
Metallic, brown	sh. ton	16.50@30.00
Red	"	14.00@18.00
Ocher, Am. common	"	10.00@15.00
Best	"	12.00@15.00
Dutch, washed	lb.	.02¾@.03
French, washed	"	.01½@.02
Paris green, pure, bulk	"	.17½@.20½
Red lead, American	"	.06½@.07½
Foreign	"	.08½@.09½
Turpentine, spirits bbl., per gal.		.80@.80½
White lead, Am., dry	lb.	.05½@.06
American, in oil	"	.07@.07½
Foreign, in oil	"	.09@.09¾
Zinc white, Am. extra dry	"	.05¾@.06¼
French, proc's, red seal, dry	"	.08½@.08¾
French, process, green seal, dry	"	.10½@.10¾
PHOSPHATES—Acid		.55@60c. per unit
*Fla., hard rock 77%		3.50@6.00
land pebble 68%		3.60@3.75
†Tenn., 78@80%		5.00@5.50
75%		4.75@5.00
68@72%		4.25@4.50
‡So. Car. land rock 60%		3.50@3.75
POTASSIUM—		
Bicarbonate crystal	lb.	$.07½@.08
Powdered or granulated	"	.08@.08½
Bichromate, Am.	"	.07¾@.08
Scotch	"	.10¾
Bromide	"	.20
Carbonate (80@85%)	"	.03½@.04½
Caustic, ordinary	"	.03½@.05½
Elect. (90% KOH)	"	.05⅛@.06
Chloride (muriate), 100 lb.		1.90
Chlorate, powdered	"	.08½@.09½
Crystals	"	.09@.09¾
Cyanide (98@99%)		
Carloads (30,000 lb.)	"	18c.
5-ton lots		18½c.
Less than 5 tons		.19
Kainite, long ton, bulk, 7.50; bags,		8.50
Permanganate	lb.	.09½@.10½
Prussiate, yellow	"	.13@.13½
Red	"	.26@.30
Sulphate (basis 90%)	100 lb.	2.18@2.21
PYRITE—		
Domestic, non-arsenical, furnace size, f.o.b. R. R.	per unit.	11½@12
Domestic, non-arsenical, fines, per unit, f.o.b. mines		10¾@11
Imported, non-arsenical, furnace size, ex-ship, per unit		.13
Imported, arsenical, furnace size, ex-ship, per unit		.12@.12½
Imported fines, arsenical, ex-ship, per unit		.09½@.10
Imported fines, non-arsenical, ex-ship, per unit		.11@11½

Pyrite prices are per unit of sulphur. A deduction of 25c. per ton is made when ore for furnace is delivered in large lumps.

SALT—N. Y. com. fine 280 lb. bbl.		.72@1.13
N. Y. agricultural	sh. ton.	3.80@4.50
SALTPETER—Crude	100 lb.	4.00@4.50
Refined, crystals	"	5.00@5.75
SILICA—		
Ground quartz, ord'ry.	lg. ton	7.00@15.00
Silex, ground	"	7.00@15.00
Silex, floated	"	35.00@40.00
Lump quartz	"	5.00@5.50
Glass sand	"	2.75
SILVER—Nitrate, crystals	oz.	.33½@.36¾
SODIUM—Acetate	lb	.04½@.05
"Alkali," per 100 lb., 58/48		.90@.95
Bicarb. soda, per 100 lb		1.00@1.30
Soda, caustic, per 100 lb., 78/60		1.80@2.00
Soda, caustic, powdered		.02½@.03
Salt cake, per 100 lb., bulk		.50@.60
Salt cake, bbl		.67½@.80
Soda, monohydrate, per lb.		1.30@1.75
Bichromate	lb.	.05¾@.06½
Bromide		.20
Chlorate, com'l	"	.08¼@.09½
Cyanide, 120-130% KCN, per 100%		
Carloads (30,000 lb.)	lb.	18c.
5-ton lots	"	18½c.
Less than 5 tons	"	.20
Hyposulphite, Am.	"	1.30@1.50
Phosphate	100 lb.	2.10@2.40
Prussiate	"	.08@ 08¾
Sal soda, f.o.b. N. Y.	"	.60@.75
Foreign, f.o.b. N. Y.	"	.80@1.00
Silicate, com'l	"	.65@1.00
Sulphate, com'l (Glauber's salt)	100 lb.	.60@.80
Sulphate, com'l, calcined		.65@.85
STRONTIUM—Nitrate	lb.	.07@.08
SULPHUR—Louisiana (prime) to New York	lg. ton.	22.00 up
To Boston, Philadelphia or Baltimore	"	22.50 up
Roll	100 lb.	1.85@2.15
Flour	"	2.00@2.40
Flowers, sublimed	"	2.20@2.60
Powdered commercial, bags		1.55
Sicilian, extra qual., unmixed seconds, crude brimstone to New York	lg. ton.	$22.00
TERRA ALBA—Fr. & Eng. 100 lb.		.75@1.00
TALC—Domestic	sh. ton.	12.00@20.00
French	"	33.00@45.00
Italian, best	"	45.00@50.00
TIN—Bi-chloride, 50°	lb.	.11½@.13½
Crystals	"	.25½@.28
Oxide, lb.	"	.37@.40
URANIUM—Oxide	"	2.20@4.25
ZINC—Chloride sol., com. 20°	"	.02½
Chloride, granular	"	.04@.04½
Dust	"	.06½@.07
Sulphate	"	.02@.02½

*F.o.b. Florida or Georgia ports. †F.o.b. Mt. Pleasant. ‡On vessel Ashley River, S. C.

NOTE—These quotations are for ordinary wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. In the cases of some of the important minerals, such as phosphate rock, pyrites and sulphur, in which there are well established markets, the quotations are substantially representative. But in the cases of some of the minor mineral products, the quotations represent what dealers ask of consumers and not what producers can realize in selling their output as a matter of private contract.